# The Chemical Age

**A Weekly Journal Devoted to Industrial and Engineering Chemistry**

VOL. XXXIV. March 14, 1936 No. 872


## The Writing on the Wall

PROFESSOR Jocelyn F. Thorpe, in his address to the Institute of Chemistry last week, emphasised the constant conflict in this country between industry and commercialism. " When commercialism and industry clash, industry retires defeated; but when they are not antagonistic they are mutually self-helpful and dependent." Professor Thorpe notes that the vast improvement in industrial conditions after the war placed commercialism in its proper place, that of subservience to industrialism as opposed to dominance, but he issues a warning that the reverse process is showing signs of becoming the rule. At the moment the British industrialist and his commercial colleague are complacent because industry is thriving. More steel is now being made in the country, for example, than even during the war, and many other trades have the same story to tell. But how hard it is to make an Englishman acknowledge that he is happy. So Professor Thorpe would have us lift our eyes from the feast and contemplate the writing on the wall.

This writing on the wall; this modern *Mene, Mene, Tekel, Upharsin*, was thus aptly interpreted by a modern Daniel, now unhappily no longer with us, Dr. A. D. Little: " The price of progress is research, which alone assures the security of dividends; the industrialist who rejects the aid of science is about to be weighed in the balance; he will there be found wanting and his business will pass to another." There can be no question of the truth of this interpretation; it is no prophecy but a self-evident fact for the world of the twentieth century is built upon the foundation of science. It is significant that the latest report of the Department of Scientific and Industrial Research mentioned certain industries which had been specifically investigated and in which it was found that, compared with their industrial rivals, " neither in the directorates nor among the technical and executive staffs is sufficient weight yet given to scientific attainment and experience."

Whilst it is true that in certain directions the warning must be heeded if disaster is not to befall, there is yet no real cause for alarm. The D.S.I.R. can point to " the most encouraging development " of the research association movement in which larger sums than ever before are being spent upon organised research. Hard-headed business men, the commercial men of the country of whom Professor Thorpe is more than a little suspicious, have subscribed ever-increasing sums for the prosecution of research, and we do not think that in all fairness it can be said that we are discontinuing research for the easier method of buying ready-made processes from abroad. We could point to many engineering firms, members of the British Chemical Plant Manufacturers' Association, who have now scientific departments with fully trained chemical engineers at the head, and which do as much development work as circumstances permit. Industry in general, and the commercial men amongst others, have learnt that only those who habitually make use of science in the daily process of manufacture can turn new advances in knowledge to their own advantage. But until the chemist and the chemical engineer are welcomed in the board rooms of industry, we cannot rest.

Industry is a partnership between the men who know how and the men who do. It is with the men who know how that the future lies. They comprise the man who knows how to control finance, the man who knows how to make, the man who knows how to find new products and processes, and the man who knows how to sell. Why should only the first and last of these four classes, and not the others, have acquired the right to direct?

A fundamental—perhaps *the* fundamental—obstacle to greater use of science in the higher councils is financial. If the Institute of Chemistry can alter that it will have done a valuable work. We recall a conversation between two chemists—both known beyond the bounds of this country for their research work. One of them was then general manager of a large concern; the other also had abandoned chemistry, but for selling engineering plant. The salesman expressed his regret that he had had to give up scientific work to engage in the somewhat uncongenial task of selling. " Still," he said, " I earn double the income." " My dear fellow," said the general manager, " we all of us come to it sooner or later. We can afford to do scientific work for a few hundreds a year when we are young. But when we are older, and it becomes necessary to amass a little in reserve, in short to make a little money, we have all to leave chemistry for commerce." There lies, in our view, the essential problem to which our prophets should address their gifts. How can the profession of chemistry be made attractive to the best type of men who, as well as being thoroughly competent, and even brilliant, chemists, have sufficient ambition not to be satisfied with inferior positions, but are capable of adventuring into unknown worlds like the merchant adventurers of old who made our nation of shopkeepers so great.

# Notes and Comments

## President of the Institute

THE Institute of Chemistry has made a wise choice in appointing Dr. Robert H. Pickard as its president in succession to Professor Jocelyn F. Thorpe, who has served the Institute so well for the past three years. Dr. Pickard studied chemistry under Professor Percy F. Frankland, at Mason University College, Birmingham (1891-95), and at the University of Munich (1896-98). He graduated B.Sc.(Lond.) with first-class honours in chemistry in 1895, and was awarded Ph.D.(Munich) *summa cum laude* in 1898. In the same year he passed the final examination for the Associateship of the Institute in organic chemistry. In 1900 he passed the special examination in therapeutics, pharmacology and microscopy, and in 1902 was elected to the Fellowship. Dr. Pickard proceeded to D.Sc.(Lond.) in 1899, and was elected F.R.S. in 1917. From 1907 to 1919 he was Principal of Blackburn Technical School and from 1920 to 1927 Principal of Battersea Polytechnic. Since 1927 he has been Director of the British Cotton Industry Research Association. Dr. Pickard served as a member of the council of the Institute from 1923 to 1926, and as a vice-president from 1927 to 1930. He is the first chairman of the chemical council and was president of the Society of Chemical Industry in 1933.

## "Blocking" Patents

IN his presidential address to the Institution of Chemical Engineers, Dr. Herbert Levinstein has again raised that important question of the validity of patents which are procured with the sole idea of "blocking" other patents. He holds that this abuse of our Patent Laws may be removed by certain of the recommendations of the Business of the Courts Committee, the remedy being to stop at the source any patent which has no reasonable chance of being upheld in court, and to make it easier and less costly to obtain a decision upon validity. We are, however, inclined to be sceptical whether the difficulty of blocking patents and of patents never intended to be used can be removed without hardship to the genuine patentee, by the simple method of reducing the number of patents issued, though we agree that it should be made much more difficult for a patent to be obtained, in the interests of the patentee himself. Dr. Levinstein's argument appears to be primarily based upon his analysis of the fate of the patents granted and in force during 1919-32. Only 27.6 per cent. of the patent applications made were kept in force as patents after the fourth year; only 9.2 per cent. were in force after the tenth year; and only 1.9 per cent. lasted the whole sixteen years. It is assumed that less than 800 patents are justifiably granted each year. Presumably the rest are classed as blocking patents, or as frivolous though possibly hindering valuable applications of serious ideas. The difficulty of assessment lies in the purpose underlying the application for patents. Whereas many of the great manufacturing corporations with a research department and a patent expert behind them can easily be accused of aiding their progress by "blocking" patents, it must be admitted that the majority of patents probably spring from the desire to improve some process or equipment. A plant operative, for example, sees that some device would improve the works in which he is interested. He is entitled to patent it. Then comes his greatest difficulty, that of inducing a constructional firm to take it up. The people to whom it is offered will generally try to get round the patent first. If they find a slightly different way, but not patentable, they will cry out against "blocking patents," but if a man makes an advance that serves as the basis for a bigger advance by someone else, he is surely entitled to benefit and cannot be accused of "blocking."

## Course for Chemical Teachers

METHODS of instruction in National Certificate and similar courses, the teaching of chemistry in relation to other technical subjects and recent advances in pure and applied chemistry will be studied in a short course for teachers of chemistry in technical schools and colleges which the Board of Education proposes to hold in London from July 20 to 30, under the direction of Dr. F. A. Mason, assisted by Dr. P. C. L. Thorpe and other inspectors of the Board. A similar course was held with success last year, when 37 teachers from various parts of the country participated. It is anticipated that this year's course will include special lectures by experts on modern developments in chemistry, visits to works and laboratories, practical work on glass blowing and metal work at the Regent Street Polytechnic, and practical work on modern methods of analysis at the Sir John Cass Technical Institute. No fee will be charged to teachers from schools and colleges in England and Wales who attend the short course, and subject to certain necessary conditions the Board will repay expenses incurred by teachers in travelling to and from the course. The number of teachers who can be admitted is limited.

## An Ant Showed the Way

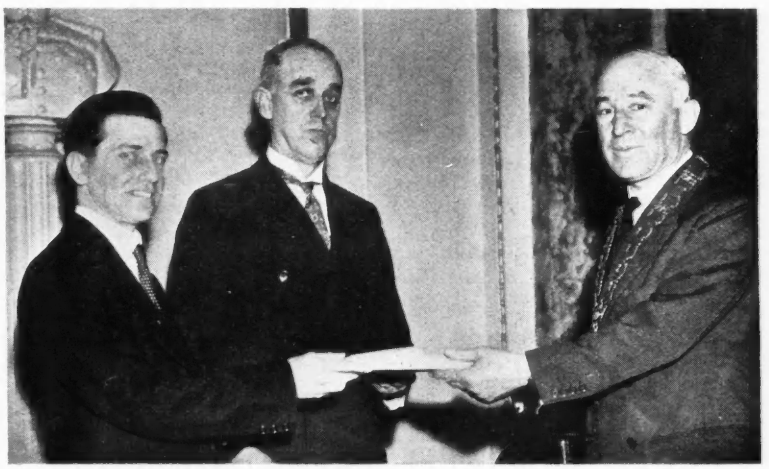
FROM what fortuitous and humble circumstances important technical developments may result is well exemplified in the case of Carson's development of the dry-indicator water-resistance test for papers, recorded in the Bulletin of the Paper Section of the United States National Bureau of Standards for December, 1935. For several years, Carson had been making a critical study of no less than 38 methods and found none of them suitable for use as a standard of general applicability. Rather discouraged, he was floating some pieces of paper on water and attempting to measure the time required for the water to penetrate through the paper, but he could not find a satisfactory end point. He left the paper in the water overnight and in the morning found an ant marooned on one of the pieces. He rather sympathised with the ant because of its overnight ordeal, so he sprinkled some sugar on the paper to feed it. Then he noticed that the sugar slowly absorbed water which had penetrated through the paper, and the thought immediately occurred to him that if he mixed a water-soluble dye with the sugar, the coloration of the mixture caused by the dye dissolving in transuded moisture would give him his long-sought end point. It worked, and thus was formed the basis of a generally accepted standard method for testing the water resistance of papers and paper boards.

# Some Modern Aspects of Trading Monopolies

## Dr. Herbert Levinstein's Presidential Address

THE 1851 Exhibition played its part in complicating patent law in that the provisional specification was then first devised for the purpose of securing protection for the latest novelties at this Exhibition, said Dr. Herbert Levinstein in his presidential address to the Institution of Chemical Engineers on March 6, when his subject was "The Grant of Trading Monopolies: Then and Now." This provisional specification gave provisional protection to exhibitors who did not have time to have their complete specification accepted, and it has remained part of our patent system ever since. Changes in procedure were introduced by the Act of 1852 and by the Acts of 1883 to 1888 which founded the present system. At the present time the law is regulated by the Act of 1907 as amended by the Acts of 1914, 1928 and 1932.

During the latter half of the 19th and the present century there has been an enormous increase in the number of patents granted both to our own nationals and to foreigners. There has also of quite recent years been a complete reversal of the fiscal policy of this country which is now a tariff country affording high protective barriers to the home manufacturer against importation by the foreigner. There has been, too, in almost every industry a concentration of manufacturers leading to the growth of fewer, larger and richer units. These facts collectively have given rise to policies, practices and results which were never envisaged by those who drafted the Patent Acts.



**Dr. Herbert Levinstein, president, presented the Moulton Medal to Dr. Ezer Griffiths (centre) and Mr. R. W. Powell (left), both of the National Physical Laboratory, at the annual meeting of the Institution of Chemical Engineers on March 6.**

The grant of English patents to foreigners, so monopolising the manufacture of important products, dyes for example, required in large quantities by the people of this country, is a matter which cannot be passed by unnoticed. The intention of the Statute of Monopolies and the Acts which have followed it was quite definitely that a monopoly should be given to the inventor for a limited time in consideration of his starting a new trade within the realm to supply the demand of the home market, and that after the period of the monopoly was over the public generally should be entitled to exercise the subject of the monopoly, having learnt the new trade from the patentee during the life of the "letters patent."

At the end of the 19th and the beginning of this century this abuse was very serious, said Dr. Levinstein. For instance, the German manufacturers of alizarine *who had no patent in their own country* but possessed one here, made enormous profits out of the people of this country by importing the substance into this country and selling it at about 2s. 6d. per pound. In 1882, shortly before the expiry of the patent, the German makers threatened to withhold supplies unless the consumers here contracted to buy it for the year *after the expiry of the patent* at the same price. These threats resulted in the formation of the British Alizarine Co., the establishment of a successful trade in home-produced alizarine and the reduction of its price to 4½d. per pound. After 20 years of persistent effort, in the year 1907 when Mr. Lloyd George was president of the Board of Trade, Parliament was persuaded to pass a new Act, the intention of which was to make it obligatory upon the foreign patent owner to work his patent in Great Britain if the product had reached the stage of manufacture abroad. As a result a large number of foreign firms took action and began to prepare to erect factories here. Unfortunately, however, almost immediately after the passing of this last Act the case of Hatschek's patents was decided. In this case Mr. Justice Parker stated in his decision that in order to satisfy the provisions of the Act it was not necessarily incumbent upon the patentee to supply the full requirements of the realm by manufacture within this country so long as he did not misuse his monopoly to the detriment of the industry as a whole. The result was that foreign makers imported almost the whole of the amount required for the market.

The 1907 Act, emasculated as it was by Mr. Justice Parker, substantially failed to secure its object. The establishment of factories in this country was arrested, large-scale manufacture was not developed, and products protected by British patents continued to be imported from abroad in large quantities and great variety. This abuse continued to be very serious until quite recent years. It has, however, become of considerably less importance since the reversal of the previous fiscal policy of this country and establishment of import duties, for nowadays foreign manufactures cannot compete with English manufactures unless they come within the barrier of import duties and establish factories and undertake production here.

The imposition of tariff duties, and the so-called rationalisation of industry, together with the granting of innumerable quite worthless patents, has, however, given rise to another abuse which is a very real and growing menace, continued Dr. Levinstein. At the end of 1934 there were no less than some 120,000 patents in force in the United Kingdom, *i.e.*, patents which had been sealed during the years 1919 to 1934 inclusive, and kept alive until the end of 1934 by the payment of renewal fees. If this number represented valid patents for useful inventions made by our own nationals, we might congratulate ourselves on our inventiveness and sleep secure in the belief that all is well with the state of this country.

During 1932, the most recent year for which the figures can be obtained, there were 37,409 applications for patents, and 16,890 patents were sealed. Moreover, it must not be forgotten that, until some 20,000 applications were rejected or abandoned, each of these applicants could truthfully use the threatening words "patent applied for." Of these 37,409 applications, 24,424 were made by persons residing in the

United Kingdom, of which 1,735 purported to have been "communicated from abroad." Of the 12,985 foreign applications, 4,397 came from Germany, 3,252 from the United States, and 1,310 from France: 8,520 of these claimed priority of date under the International Covenant.

To see how far the grant of these patents was justified, we must study the figures of the patents sealed or in force between the years 1919 and 1932. Doing so, we find that patents were granted on 52 per cent. of all the applications. Those patentees obtained a monopoly for four years by the payment of their application and sealing fees (then £5, now £6 in all), but only 53 per cent. (*i.e.*, 53 per cent. of 52 per cent. of the applicants) of them found their patents sufficiently worth while to pay a renewal fee of £5 for another year; only 17.7 per cent. decided to pay the further fees of £40 in all which kept their patents in force until the end of the tenth year; and only 3.7 per cent. of the patentees (*i.e.*, only 1.9 per cent. of the applicants) maintained their patents for the full sixteen years by payment of the full renewal fees of £126. On average, therefore, we may expect that only approximately 800 of those 37,000 persons who made application during 1934 will have sufficient confidence in their own patents to maintain them in force for the full period.

## Many Bogus Documents

It may be assumed, therefore, that less than 800 patents are granted annually which are worth while or justifiable, and that approximately 20,000 patents are allowed to become void every year. Consequently, at the most, there ought at the present time to be no more than 11,600 patents in force (taking 1½ years as the average period between application and grant), instead of nearly 85,000. It can safely be said that if 95 per cent. of the patents granted had been rejected at the outset, no great loss would have been inflicted on the patentees, for more than one-half were after four years not worth a £5 note to their owners.

In many cases these patents are bogus documents making in some cases merely foolish, but in others bluffing and menacing monopoly claims. Their effect, however, is very serious on the industry in this country. Powerful and rich combines own many, even hundreds, of patents, and many of these patents have very wide but, if tested in court, quite invalid claims. By means of these so-called "blocking" patents, which are taken out for the express purpose of intimidating others in the industry from approaching the field of the patentee, research is stifled, prices are often far higher than they should be, and the incentive of healthy competition is lacking to make the patentee improve his product.

## Two Possible Remedies

This state of affairs, concluded Dr. Levinstein, is a very serious abuse indeed and public opinion does at last seem to be roused. There appear to be two remedies, both of which have been, to some extent, initiated by the Report of the Business of the Courts Committee just issued. These two remedies are (1) to stop at the source any patent, the claims of which have not got a reasonable chance of being upheld in court, and (2) to make it easier and, what is more important, much less costly to obtain a decision in the courts upon the validity of a patent.

In the years 1934 and 1935, 22 patent actions were fought. In 13 of these the patents were held invalid, in nine the patents were held valid, but of these nine the patents were held not to be infringed in five cases and in two cases validity was not argued. It was only in two cases, where validity was challenged, that the plaintiffs were entirely successful, both upon validity and infringement. Approximately 60,000 patents were applied for in the two years; two only were held valid and infringed.

The first remedy, namely, to stop at the outset any patent in all probability invalid, is a reform which can fairly easily be carried out. Probably 90 per cent. of patents which are tested in court fail merely because they do not satisfy the test on the issue of subject matter. This means that the invention in question is obvious, having regard to what was known or used previously. At the present time the Patent Office during the process of examination of a patent prior to grant is for all practical purposes debarred from considering whether or not the invention is obvious in view of what has been used or disclosed in a document prior to the application date of the patent. All the Patent Office can do is to see that the invention is properly described and ensure that the exact mechanism or process as the case may be has not been disclosed before. The result of this is that, provided it differs from prior disclosures and prior claims, and, practically speaking, however slight that difference, a patent will in due course be granted on almost every application. Were it possible for the Patent Office to throw the onus on the applicant of satisfying it before grant of the non-obviousness, and preferably also on the utility and sufficiency, of his application, a very large proportion of the patents now granted would be refused.

The second, and equally important, remedy suggested is to make it possible for a potential infringer to test the validity of a patent in the courts without incurring undue expense. An enormous amount of time now wasted by both sides in taking every conceivable point against the other, out of ignorance of the real case of such other, would be saved if, as is suggested by the Courts Committee, documents setting out fully the case of each party from a legal point of view and proofs of the expert evidence proposed to be called were exchanged by the parties prior to trial. The real issues between the parties being known before they came into court, expert evidence could be enormously shortened, and there would then be no reason why a patent action, save in exceptional cases, should be a lengthy and expensive business.

## The Annual Business Meeting

Dr. HERBERT LEVINSTEIN, presiding at the annual business meeting of the Institution, referred to the death of King George V and said the council had decided to postpone the annual dinner until June 23, when it will be held in conjunction with the Chemical Engineering Congress. On that occasion it is anticipated that many distinguished guests from other countries will be present.

The report and accounts were unanimously adopted, a very satisfactory state of affairs being revealed. In presenting the accounts, Mr. F. A. Greene (hon. treasurer) made a special appeal for assistance in connection with the Benevolent Fund and suggested that members might consider sending in a donation with their annual subscriptions.

The PRESIDENT announced that Dr. A. J. V. Underwood had agreed to act as joint hon. secretary with Mr. H. W. Cremer, a fact which was evidence of the growth of the Institution and the heavy duties attaching to the office. Mr. Cremer and Dr. Underwood are presenting a paper to the Chemical Engineering Congress on the education of chemical engineers. He recalled how in the early stages of the Institution it had been necessary to define the education which it was thought necessary for membership of the Institution, and now they had reached the stage when two officers of the Institution would be responsible for dealing with that matter in the light of the experience that had been gained.

The result of the ballot for officers and members of council for the coming year was announced as follows:—President: Dr. H. Levinstein; vice-presidents: Dr. W. Cullen, Dr. F. S. Sinnatt; hon. secretaries: H. W. Cremer, Dr. A. J. V. Underwood; hon. treasurer: F. A. Greene; members of council: H. Beaver, E. Briggs, R. F. Stewart; associate member of council: K. Fraser.

The presentation of medals included the Osborne Reynolds Medal to Mr. F. A. Greene, for meritorious service for the advancement of the Institution; the Moulton Medal to Dr. Ezer Griffiths and Mr. R. W. Powell, for their paper on "The Evaporation of Water from Plane and Cylindrical Surfaces," and the William Macnab Medal (first award) to Mr. D. K. Moore, for meritorious work in the Associate-membership Examination.

# The Dead Sea: A Storehouse of Chemicals

## Growth of a Remarkable Industry

CLOSE chemical investigation of, and experimental work on, the mineral resources of the Dead Sea, which ultimately led to the formation of Palestine Potash, Ltd., for their exploitation, began in 1911 and proceeded for a number of years, interrupted only by the war years 1914 to 1918, until January, 1930, when the company was formed, said Mr. M. A. Novomeysky, M.Inst.M.M., in a paper read before the Institution of Chemical Engineers on March 6.

Table I gives some analyses showing the weights in grams per litre of the salts in the water of the Dead Sea at the surface and at various depths:—

TABLE I.

| | Surface sp. gr. 1.1646. | Surface sp. gr. 1.1725. Temp. 23°C. | Depth 175ft. sp. gr. 1.224. Temp. 23°C. | Depth 360ft. sp. gr. 1.2343. |
|---|---|---|---|---|
| KCl .. .. | 9.96 | 11.80 | 14.7 | 15.67 |
| NaCl .. .. | 70.96 | 82.4 | 84.2 | 87.38 |
| $MgCl_2$ .. .. | 109.50 | 142.4 | 163.7 | 169.04 |
| $CaCl_2$ .. .. | 31.01 | 33.0 | 47.5 | 46.66 |
| $CaSO_4$ .. | 1.32 | 1.3 | 0.6 | 0.64 |
| $MgBr_2$ .. | 4.45 | 3.9 | 5.9 | 7.30 |
| Total Salts (gr. per litre) .. | 227.10 | 274.8 | 316.6 | 326.69 |

To determine if the extraction of potash from the waters of the Dead Sea by solar evaporation were a practical problem, it became necessary to find the exact rate of evaporation of the brine from the Dead Sea during successive months of the year and the concentration at various stages of that evaporation. In addition, data had to be collected concerning the separation of various salts by fractional crystallisation; the most economical method of producing from the carnallite thus obtained a potash salt of the grade required by the markets, namely, 80 to 99 per cent. potassium chloride; the most suitable point from which concentrated brine with the highest content of potash and bromine could be pumped to evaporating pans; and considering the levels, composition and imperviousness of the ground surrounding the Dead Sea, its suitability for the construction of evaporation pans.

### Finding the Rate of Evaporation

The important data relating to the rate of evaporation on the northern shore of the Dead Sea, which are derived from a large number of experiments, are as follows:—

(a) A brine of sp. gr. 1.20 being concentrated to a sp. gr. 1.29 in the first stage evaporates at the rate of 6.3 mm. in 24 hours in a period of 200 days. (March 15 to October 15.)

(b) A brine of sp. gr. 1.29 being concentrated to a sp. gr. 1.34 in the second stage evaporates at the rate of 4.0 mm. in 24 hours in a period of 150 days. (May 15 to October 15.)

(c) A brine of sp. gr. 1.34 being concentrated to a sp. gr. 1.37 in the third stage evaporates at a rate of 1.25 mm. in a period of 75 days.

Taking for the first stage an evaporating season of only 200 days, and for the second stage 150 days, the corresponding figures will be:—For the first stage—the common salt period—1,260 mm. in 200 days = 1.26 t. water per 1 sq. in. For the second stage—the carnallite period—600 mm. in 150 days = 0.6 t. water per 1 sq. in.

The separation of common salt begins when the brine reaches a sp. gr. of 1.22 to 1.23, depending on the temperature. Over 90 per cent. of the salt contained in the brine is separated at a sp. gr. of 1.28 to 1.285. The rest separates with carnallite. The analysis of the salt at this stage showed a content of only 0.01 per cent. of potassium chloride.

The various experiments on evaporation of mother liquor of a sp. gr. 1.28 to 1.29 to a sp. gr. of 1.330 when carnallite separates, definitely proved that it was impracticable to carry out this evaporation in one uninterrupted process and in one tank. Carnallite, which begins to crystallise at a sp. gr. of 1.285 to 1.290, contains in the early stages of evaporation and specially between sp. gr. of 1.29 and 1.307 a large amount of sodium chloride, which makes the subsequent working up of the carnallite to a high grade potassium chloride difficult and expensive.

The content of magnesium chloride in the brine during the crystallisation of carnallite, increases regularly with the sp. gr. and is not influenced by the rapid or slow process of separation of carnallite.

### Producing High Grade Carnallite

Results of experiments inevitably led to the conclusion that, to produce a high grade carnallite with a small content of sodium chloride and to extract the whole of the potassium chloride contained in the water of the Dead Sea, subjected to evaporation, the process of evaporation during the second stage would have to be divided in two or perhaps three parts; that is, carried out, not in one pan, but successive stages in two or three pans or groups of pans. Experiments conducted on these lines proved this assumption, as clearly demonstrated by the following analysis (Table II) of two carnallites produced—one by the first method, in which the evaporation was effected in one pan; and one by the second method, in which two pans were used in series.

TABLE II.

| | First Method, one pan. | | Second Method, two pans. | |
|---|---|---|---|---|
| | | | Fraction A. | Fraction B. |
| Periods .. | June 17 to June 30. | July 18 to July 29. | Aug. 9 to Aug. 12. | Aug. 13 to Aug. 17. |
| Sp. gr. .. .. | 1.29-1.328 | 1.29-1.328 | 1.288-1.307 | 1.309-1.336 |
| | | | | Adherent Liquor 19.30% |
| KCl .. .. | 17.0% | 18.65% | 13.06% | 20.27% |
| NaCl .. .. | 24.5% | 16.00% | 31.50% | 5.70% |
| $MgCl_2$ .. .. | 25.8% | 28.60% | 25.00% | 33.50% |
| $H_2O$ .. .. | 30.9% | 36.80% | 30.40% | 40.50% |
| Pure Carnallite | 63.0% | 69.10% | 48.32% | 75.13% |

Of the total of 16 kgs. of carnallite produced by the experiment from August 9 to August 17, 4 kgs. = 25 per cent. belong to fraction A, 12 kgs. = 75 per cent. belong to fraction B.

From the theoretical calculation made it is evident that the carnallite, having a high content of 17 per cent. of sodium chloride and a minimum of 18.65 per cent. of potassium chloride, produced by the first method of evaporation in one pan, could not be easily converted to high grade potassium chloride of 80 per cent. purity by the proposed decomposition with cold water.

On the other hand, a carnallite having a composition given by fraction B in Table II, produced by the second method, could easily be converted into a high grade potassium chloride by decomposition with water. Experiments made with fraction B of carnallite have fully established this fact.

### Conversion to High Grade Potash

Experimental work proved conclusively that potash, notwithstanding its very low percentage, a little over 1 per cent., in the waters of the Dead Sea could be recovered, as carnallite, containing about 20 per cent. of potassium chloride, by solar evaporation in open pans, built on similar lines to those used in the production of common salt in the South of France, California, Egypt and Spain and that the carnallite thus obtained could be converted into a high grade potash by a singe treatment with cold water.

It was in February, 1930, that Palestine Potash, Ltd., began constructional work with a view to extracting and developing the salts contained in the Dead Sea on a commercial scale.

A year later the first bromine plant with a daily capacity of one ton was in operation, and in February, 1932, the first few hundred tons of potash in the form of high grade potassium chloride were despatched. The first part of the programme, namely, to produce 10,000 tons of potassium chloride and about 250 tons of bromine per annum, was completed by the end of 1932. Based on the results of the experience gained with this plant and the mistakes made, improvements were introduced, and both the plants for the manufacture of potash and bromine have been enlarged, so that the capacity is now 25,000 to 30,000 tons of potash and 1,000 to 1,200 tons of bromine per annum.

### New Harvesting Method

Harvesting of salt by hand, such as is practised in all countries which produce salt by solar evaporation, has the disadvantage that the pans must be drained in the autumn to enable the workmen to enter them to collect the salt. The actual working season of the plant is, therefore, curtailed, while with the new harvesting method introduced by Palestine Potash, Ltd., in which floating suction dredges are used, the process of collecting the carnallite can continue without interruption throughout the year provided the pans have sufficient quantities of brine in them, namely, between 5 in. and 6 in. in depth, to enable the dredges to float.

From the pans the carnallite is pumped in the form of a slush through flexible pipes which are floating in the pans to specially constructed separators, where the solid carnallite remains, while the brine returns to the pans. The residual brine of 1.33 to 1.34 sp. gr. remaining in the carnallite pans after the removal of the carnallite, flows by gravity into the lower pans, where magnesium chloride crystallises in large crystals, while a part of the remaining liquid, the final brine, of 1.37 to 1.38 sp. gr. with a bromine content of 13 to 14 grams per litre is pumped into the bromine factory, where the bromine is extracted by treatment with chlorine and steam. The greater part of the final brine is discarded into the sea. Some calcium chloride in the liquid form, however, is being produced by treating with slaked lime the final brine, which contains about 155 gr. of calcium chloride and 370 gr. magnesium chloride per litre.

The separators are emptied of carnallite by means of fresh water or brine which is returned from the refinery and forced, under pressure, through 1½ to 2 in. dia. rubber hose. The new sludge thus formed passes through the gates of the separators into the troughs and mixers of the refinery. The quantity of water or brine entering the separators is so regulated that the decomposition of carnallite takes places only in part during this short operation.

### Highest Possible Concentration

Fresh water or brines returning from processes in the refinery and containing potassium chloride in solution, are added in such quantities as to produce the highest possible concentration of magnesium chloride in the resulting liquor. At the same time, the maximum amount of potassium chloride mixed with sodium chloride will remain in the sediment. The solutions which would be saturated with magnesium, potassium and sodium chlorides at 15° and 40° C. were known, and have been ascertained in the research laboratory for the other temperatures which prevail during the operation in the refinery. Knowing the analyses of the carnallite treated and the solubility figures for the saturated liquor to be produced, the quantity of water or brine to be used for decomposition can be easily calculated.

Experience has shown that in the decomposition process ½ ton of water to 1 ton of carnallite is an average figure. This figure allows for the variations in the composition of carnallite and provides for a small excess of water over the calculated figure. The actual time of mixing is between 30 and 45 mins. A carnallite containing: KCl, 22.23 per cent.; NaCl, 8.96 per cent.; $MgCl_2$, 29.57 per cent., leaves after a treatment of half-an-hour with sweet water at 15° C. a sediment, sylvinite, containing: KCl, 50.38 per cent.; NaCl, 20.75 per cent.; $MgCl_2$, 7.65 per cent. The solid sylvinite thus produced in the mixers is separated from the decomposition liquor in rotary vacuum filters. The wet sylvinite is transported by a steel belt and screw conveyors either to large horizontal settling tanks, each 120 tons capacity, and provided with vacuum, or to cylindrical tanks with a mixing device where the final refining and conversion into a high grade potash salt, 80 per cent. to 99 per cent. potassium chloride, takes place. The liquor from the rotary vacuum filters passes to horizontal cylinders, within which a vacuum is maintained, and from these it flows to the carnallite pans where the potassium chloride is regenerated in the form of carnallite.

To separate the artificial sylvinite in the settling tanks from the excess of sodium chloride the surface of the tank is sprayed once or oftener, dependent on the purity of the potash required, with sweet cooled water. This so-called washing process frees the wet potash salt from the rest of the magnesium chloride and the greater part of the sodium chloride. The liquors from this process run into the salt pans where, through evaporation, sodium chloride is deposited, while the potassium chloride is subsequently regenerated in the next operation in the carnallite pans.

The carnallite given above with the composition of 22.23 per cent. KCl and 8.96 per cent. NaCl, decomposed after its first treatment with water into a sylvinite with 50.38 per cent. KCl and 20.75 per cent. NaCl, and this sylvinite after the first spraying with water showed a content of 78.1 per cent. dry KCl. With one or more treatments with sprays of water, or, at the end, with brine saturated with KCl, the product can be brought to any purity up to 99 per cent. KCl.

The final wet product is removed from the settling tanks by a mechanical scraper and transported by conveyors and elevators to a rotary horizontal drying screen heated with oil, and from there to a modern storehouse which is so arranged that the material can be either delivered in bulk or mechanically packed into bags.

In the production of potash, Palestine Potash, Ltd., does not import any raw materials, apart from the fuel oil for drying the wet potash (which contains about 10 per cent. moisture) and Diesel oil for generating electric power.

### Points from the Discussion

Capt. W. H. CADMAN said the work described was a great achievement. It was only those who knew that part of the world before anything was done, who could appreciate what an enormous amount of spade work had to be done to arrange for the erection of plant, general layout and everything else connected with the chemical engineering problems involved. He asked whether there had been any signs of corrosion in the steel pipes, because experience of pipe lines in other directions suggested that the presence of magnesium chloride and other salts was a source of great trouble in this respect.

The AUTHOR said that by way of test they had taken anchors and chains which the Germans had used during the war and put them into the water at various depths. At a depth of a few metres there was corrosion, especially if near the point where the River Jordan entered the Dead Sea. Keeping away from that place, however, and going to a depth of several metres it was found that the anchors and chains after being in the water for a long time were as clean, when they were taken out, as when they were put in. The pipe line was examined every year and there were no signs of corrosion. There was, however, a certain amount of trouble due to corrosion from the air, and everything liable to such attack had to be painted twice a year. Moreover, it had been found that if materials liable to be attacked by corrosion were buried in the brine during the winter they were fully preserved.

Mr. D. K. MOORE said that unless the separation of the salt from the mother liquor was carefully carried out there would be a considerable quantity of magnesium chloride left in the salt. With regard to corrosion, it would be interesting to know if there were any difficulties in connection with the vacuum filters. These filters were met with brine solution

and at one moment part of the filter was exposed to the atmosphere and then it went into the liquor, and so on continuously. In working out his scheme, the author had had the advantage of solar heat, and also the great advantage that the different salts could be separated at low temperatures. The conditions were such that it was not necessary to use high temperatures to effect the separation.

A rather remarkable feature about the paper was the production of magnesium chloride crystals. Until that afternoon he should have said that magnesium chloride was deliquescent, but it was undoubtedly hygroscopic. If a piece of magnesium chloride was placed on a watch glass it would, in time, become a solution. The author was doing the reverse process.

The AUTHOR, referring to the common salt, which contained some mother liquor, said it was sprayed with water and the resulting product was 99 per cent. purity. As a matter of fact, Imperial Chemical Industries, Ltd., had wanted to investigate the problem of producing some other chemicals in conjunction with this potash plant and required pure salt, and they were quite satisfied with the salt obtained. As to corrosion of the vacuum filters it was not yet known how they would be affected, but there was not one part dry and one part wet. Actually, the whole of the filter not in the liquid was sprayed with water so that the whole of the vessel was always wet. There was not a wet and a dry side. This spraying also helped the process of decomposition and refining of the crude potash which was going on all the time. So far there had been no signs of corrosion, and when the filters were stopped they were greased. The filters were in a special alloy made by Wolff, of Magdeburg.

Mr. R. F. STEWART inquired as to the physiological effects upon the men working at these low altitudes with high humidities. He also asked whether the common salt from the process contained any bacteria, remarking that he had been shown some common salt by Professor Gibbs, who had prepared it by evaporation from the Dead Sea, and after storing it in a bottle for some years obtained a culture of pathogenic bacteria.

The AUTHOR, replying on the question of the effect of the climate on the workers, said a committee had been appointed by the Government here when this project first came under consideration, and the chairman had asked who was going to live in such a climate. Therefore he himself had tried it out by living there for several months during the hot summer period for a few years, and as he had not died he assumed the climate would be all right for others. It had been found that bathing, both in the Dead Sea and in the salt pans, was an excellent cure for rheumatism.

# Modern Government

## Sir Ernest Benn's New Book

SIR ERNEST BENN'S new book, "Modern Government" (Allen and Unwin, 6s.), was published on Tuesday. Its sub-title, "As a Busybody in Other Men's Matters," gives the key, if one were needed, to the aspect of the subject which Sir Ernest Benn has set out to explore. The main argument, as he states it, is that the best government is that of which there is the least. Sir Ernest Benn finds government as practised in the twentieth century encrusted with gross excesses, which he proceeds to attack persuasively, wittily, and with formidable force. He is more particularly concerned to expose the folly of government action in the economic sphere. He deals faithfully with the houses the politicians have subsidised and the milk the bureaucrats are marketing, but his criticism goes beyond such schemes in restraint of trade and their authors.

His complaint against the democratic State of to-day is that it is no longer a source of spiritual inspiration, but has become a materialistic pawnshop. He points out that there are great vested interests in the State, chief among them the Civil Service and the Board of Education. "Many teachers," he says, in a telling phrase, "have turned trade unionists, and a corresponding number of old teachers are turning in their graves." He protests against the familiar theory that "something must be done," no matter what.

It is the business of government to remove trouble. Sir Ernest Benn contends that, if a government employs some hundreds of thousands of officials to look after trouble, there will arise a dangerous vested interest in it which will probably succumb to the temptation to arrange or invent enough to keep itself employed. He accuses the present generation of having forgotten the nature of trade, reversed the economic policy of a century of progress, abandoned the consumer, and pandered to the weakness of the producer. The results have been the destruction of international commerce, the transformation of home trade into a weak, hothouse product, and the reduction of the wonderful money services of the world to chaos.

"Modern Government" is a highly stimulating book, with a stream of original thinking and apt phrasing running through it. Sir Ernest Benn once more utterly disproves the popular idea that a book on economics cannot avoid either being dull or packed with statistics. It suffers from neither of these defects, and is, in fact, an easily-read contribution to the overmastering problem of the age.

# Oil Drilling in Britain

## Importance of Present Operations

THE importance of present activities in the search for oil in this country was stressed by Sir John Cadman (chairman of the Anglo-Iranian Oil Co., Ltd.) in his presidential address to the Institution of Petroleum Technologists, at the Royal Society of Arts, London, on March 10. He said the petroleum industry as a whole will eagerly await the decision whether or not Great Britain is to be added to the oil countries of the world, even though there seems little likelihood that, at the best, its potentialities will prove to be at all comparable with those of the major producers. Work on the areas which had been licensed was now in progress, and very shortly deep drilling would begin on certain selected structures. It was impossible to forecast the result of the search which was now commencing in a spirit of temperate optimism, but there was already sufficient evidence to justify test drilling on a not inconsiderable scale.

Advocating a more closely knit structure for the coal industry, Sir John Cadman said that there would be more ground for optimism for the future of that industry when it showed signs of departing from its traditional structure and adopting some other which would enable it to produce and sell, not lumps of coal, but calories in the forms most acceptable to consumers. If such a structure had been adopted during the nineteenth century, the coal industry would now be a true fuel industry, producing coal, manufacturing gas and the by-products of carbonisation, generating electricity and selling coke.

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THE insufficiency of foreign exchange and consequent necessity of curtailing all imports, including even the most vital raw materials, has reduced Germany's linseed oil supply. In 1934, total production of linseed oil in Germany amounted to 104,000 metric tons, while net imports of linseed oil into Germany for the first 10 months of 1934 and 1935 were, respectively, 11,200 and 9,500 metric tons. German consumption of linseed oil is almost entirely for manufacturing purposes, only small quantities being used for edible consumption; in 1934 the margarine industry utilised only 6,400 metric tons of linseed oil as against a total national consumption of over 115,000 metric tons. The domestic paint and varnish industry in 1934 consumed about 70,000 metric tons. Average consumption in 1935 amounted to from 75 to 88 per cent. of the 1934 quota basis.

# Applications of Metal in Chemical Engineering—II

By H. W. CREMER, M.Sc., F.I.C., M.I.Chem.E.

**Extracts from an Address delivered before the London Section of the Institute of Metals on February 6.**
**(Continued from page 216)**

THE chemical engineer has been greatly handicapped in the past by the loss of strength of constructional materials at high temperatures, and he has undoubtedly benefited by the great strides which have been made in recent years in the production of new alloys to withstand severe conditions of temperature. The various heat-resisting cast irons are deserving of special mention in this connection, for example, Silal, Nicrosilal, Ni-resist and the high chromium irons, to which further reference will be made. Such materials retain strengths at high temperatures to a much greater extent than ordinary cast irons and steels, and, since many industrial processes involve heating up to about 700° C., this is of great importance. Amongst other valuable properties, some of these materials offer particularly good resistance to sulphur-bearing gases, which become such serious corroding agents at elevated temperatures.

## High Temperature and Pressure

The accelerating effects on corrosion of raised temperatures is much more common than is generally realised, for many apparently harmless substances, certain oils, for example, which are innocuous at ordinary temperatures become violent corroding agents at high temperatures, particularly under increased pressure. The case of hydrogen has already been mentioned. As in these and other cases it is when high pressure is coupled with high temperature that the greatest difficulties are to be expected. This fact is of great significance, for there is a growing tendency in the chemical industry to employ such conditions. Typical examples are provided by the modern synthesis of ammonia and the hydrogenation of coal, the former well established for some years past and the latter very much in the public eye at the moment. A very marked feature which has characterised commercial development in these fields is the rapidity with which the results of small-scale investigations have been utilised on the manufacturing scale.

The manufacture of ammonia by synthesis from nitrogen and hydrogen by the Haber-Bosch process was commenced in Germany in 1913. The conditions prevailing during the Great War, when Germany was unable to import nitrate from Chile, undoubtedly gave the industry an enormous impetus, and the production by this process in Germany to-day is of the order of 500,000 tons of fixed nitrogen per annum. Towards the end of the war the department of Explosives Supply of the Ministry of Munitions undertook the preparation of the necessary plans for similar production in this country, and I can personally testify to the tremendous difficulties presented through the lack of both theoretical and practical knowledge concerning the properties of constructional materials under the unusual conditions imposed by the process. This work was taken over subsequently, at the request of the Government, by the firm of Brunner Mond, later to become a part of Imperial Chemical Industries, Ltd., at the Billingham Works of which the output of fixed nitrogen per annum is now of the order of 200,000 tons. The conditions employed at Billingham for the actual ammonia synthesis are 500°-550° C. and approximately 250 atmospheres pressure.

## Early Plant at Billingham

The first plant to hydrogenate bituminous coal on the scale of a commercial sized unit for any prolonged period was erected at Billingham in 1929 and ran until the end of 1931. The total flow sheet output of the present large-scale plant is stated to be 150,000 tons per annum of petrol, of this approximately 10,000 tons is to be derived for low-temperature tar, 40,000 tons from creosote oil, and 100,000 tons from coal. Pressures in the region of 200 atmospheres are used in this case, at temperatures in the neighbourhood of 450° C. A detailed account of the high-pressure plant for hydrogenation processes at the Fuel Research Station, Greenwich, has been given by A. T. Barber and A. H. Taylor,[2] and K. Gordon recently described the large-scale development of coal hydrogenation by Imperial Chemical Industries, Ltd.[3]

A further example is provided by the production of methyl alcohol (methanol) from carbon monoxide and hydrogen, the output of which in the United States by this process was 500,000 gal. in 1927, whereas three years later it had risen to the huge figure of 10,000,000 gal. The usual working conditions for this process are 400° C. and 200-300 atmospheres.

Such figures alone are impressive, but when considered in relation to plant design and construction they are infinitely more so. The majority of chemical processes of yesterday were conducted in vessels, the effect of failure in which, although possibly attended by dangerous consequences, was at any rate localised. This is not so with the high-pressure equipment of to-day, and those who have visited works where high-pressure technique is utilised on so large a scale cannot fail to be still more impressed by the atmosphere of security in which such operations are carried out. To have arrived at such a state of affairs in comparatively so short a space of time is surely an altogether remarkable achievement and one upon which the metallurgist and chemical engineer alike may be justly proud.

## Possibilities of Still Higher Pressures

It has been stated in this country by those well qualified to express an opinion that 1,000-atmosphere technique is now fully established, at any rate up to a temperature of 200° C. The fact to which the attention of metallurgists should be drawn is this, however, *viz.*, that immense possibilities are being opened up by the application of still higher pressures to chemical syntheses, and herein lie many of the metal problems of the future. It is quite impossible to touch even the fringe of this vast subject in a paper of this kind, save to remind you that the number of useful compounds capable of production from two such simple substances as hydrogen and carbon monoxide alone is quite astonishing. In the synthesis of ammonia by the method already referred to, 1,000 atmospheres have been employed at temperatures of 550° C. by Claude in commercial plant, under which conditions the equilibrium mixture of ammonia, nitrogen and hydrogen contains about 40 per cent. of ammonia as against 13 per cent. at the lower pressures quoted. These high conversion rates are very economical as regards power and another advantage of the higher pressure is that the ammonia produced is available in liquid form. Basset, in France, has used experimentally 3,000 atmospheres at 700° C. for the same reaction.

In this country research into this most interesting field of the influence of temperature and pressure on chemical reaction is being carried on at the Fuel Research Station, Greenwich, at the Chemical Research Laboratory, Teddington, at Imperial College, London, at the Research Laboratories of Imperial Chemical Industries (Alkali), Ltd., Northwich, and elsewhere. Recent experimental work in the laboratories at Northwich has utilised pressures up to 12,000 atmospheres at 250° to 300° C. Plant for pressures up to 15,000 atmospheres has been designed for use at Imperial College at ordinary temperatures; Bridgman, in America, claims to have employed 50,000 atmospheres.

Although the bulk of this ultra-high pressure work is of

[2] High Pressure Plant for Experimental Hydrogenation Processes. A. T. Barber and A. H. Taylor, "Inst. Mech. Eng.," Nov., 1934.
[3] The Development of Coal Hydrogenation by Imperial Chemical Industries, Ltd. Kenneth Gordon, "Inst. of Fuel," Nov., 1935.

an experimental nature, the size of the reaction chamber being small in relation to the plant employed, the fact remains that the vision of to-day may speedily become the reality of to-morrow, and this will largely be determined by the ability of the metallurgist to supply the requisite materials not only as such but in the form of forgings of the appropriate quality and dimensions. Forging methods are being developed by manufacturers so that forgings are cross forged and worked in such a way that their properties are not solely in one direction, and much work is being done on the heterogeneity of large steel ingots. The production of ingots up to 150 tons in weight in alloy steels is a notable achievement, particularly when their subsequent handling and forging are taken into consideration. Such developments are proving invaluable in translating the technique of the high pressure laboratory to the full production scale, and it is only fitting to acknowledge here the assistance which high pressure chemical research is receiving from some of the well known steel firms and other bodies in this very difficult field of investigation. It is essential, however, that modern chemical engineers and metallurgists as a whole should be taught to be " pressure-minded," for, quite apart from the use of high pressures in promoting chemical reactions such as I have named, their use in a far larger field is inevitable, resulting as they do in many cases in more compact plant, together with attendant economy in material and greater ease and certainty of control.

(*To be continued.*)

# Letters to the Editor

## The Poisons Board

SIR,—A minor disturbance appears to have been created by the proposed new regulations dealing with poisons: the reason seems somewhat difficult to understand. The amended report of the Poisons Board suggests that the preparation of specified types of materials shall be under the supervision of (a) registered pharmacists and (b) Fellows and Associates of the Institute of Chemistry, and provision is also made whereby the manufacture of glandular preparations may be supervised by a qualified medical man and whereby persons who have been occupied continuously in the preparation of the specified products for a period of three years need have no fear of losing their means of livelihood.

It is matter of general consent that legislation in chemical matters is long overdue, and while the general suitability of pharmacists for such work is of course open to question, there will be no doubt that medical men are quite well equipped for the work which the report proposes may be entrusted to them.

The Institute of Chemistry, as all in the profession should be aware, is an examining and qualifying body. There is no back door, the qualifications of the Institute being granted only on presenting documentary proof of higher education followed by evidence of scientific training at institutions specified and, finally, by an examination conducted by chemists who are not only experienced in examinational work, but who are, without question, the very leaders of chemistry. Provision is made so that those who have taken an honours degree in chemistry may apply for that examination to serve the two purposes and thus have A.I.C. conferred. Those who are acquainted with the examinations of the Institute, particularly in recent years, will be familiar with the gruelling conditions, and while candidates suffer acutely, it is right and proper that the examination should be thoroughly searching and the qualifications indubitable evidence of competence in chemistry.

The British Association of Chemists, representing a small portion of chemists, is rather distressed because the report has not included its members. The reason for this is very probably in its constitution. In the first place it is registered as a Trade Union and its function is as a Trade Union. It is *not* a qualifying body though its membership is said to imply competence. While it is likely that all its members are suitably qualified, it must be admitted that its rules allow of the admission of unsuitable persons, for there is no form of examination and it is possible for a man to gain admittance if he has had some elements of scientific training and seven years' experience in the chemical industry.

In the case of older men this rule is quite a good one, for there was not the same provision for organised training years ago that there is now: but for younger men, whose youth could have been spent at any rate at evening classes, their lack of qualification is due to idleness or inability and the rule provides ill-equipped men with a back door into the profession.

The case may be taken of a man who starts as a youth in a chemical firm. His earlier years would be spent as a humble assistant to a qualified person and during this time he would gain considerable experience, but only in the class of work upon which his senior was engaged, and unless he attended some institution for general tuition, his knowledge of chemistry as a whole would be poor. As he grew older, his intimate knowledge of his isolated branch, let us say sugars, would be of great value to his employers who, after a time, would make him a senior and dub him " chemist." Without any question the correct title for this man is " sugar manipulator," and though he claims the name of chemist and serves a firm which has given him the title, he is clearly incompetent to deal with chemical questions outside his own sphere: indeed, to allow such a person to have charge of certain processes might prove a real danger.

Cases such as this have occurred, and it is frequently found that as a young man the " chemist " has probably gone through the movements of attending classes, but these have been abandoned, generally because it was too much trouble or the examinations were too difficult for him. If it can be shown that he has attended classes and that he has had seven years' experience, backed by evidence of suitability signed by well-meaning friends, there does not seem to be any reason why he should not become a member.

It can probably be proved that all its members are well qualified and there is none with such a history, but the apparent weakness of the rule does not detract from the possibility of its occurring. When it is considered that there exists no reason why a younger man, if he has diligence and ability, should not take an accepted qualification, it would seem advisable for the B.A.C. to amend the rule to read that membership in cases of lack of qualifications would be allowed only in cases of men who were, let us say, 21 years of age in 1921, and to point out that, as qualifications are now available for those of ability who will work for them, they must be taken.

It may be taken that a goodly portion of the members of the B.A.C. are qualified by the Institute of Chemistry, and they, together with those who have been engaged for the requisite period on the work in question, are not in the least likely to be affected. Other members who, sometime in the future, take up such work would have no difficulty whatever, for if they have qualifications which will bear the light of day the Institute of Chemistry will accommodate them. Actually, as the B.A.C. is a Trade Union, not an academic body, it would seem that it should lend its support to any movement which is a step towards the weeding out of undesirables; this being the prime function of such an organisation.—Yours faithfully, CONSULTANT.

# I.C.I. Capital Reduction Scheme

## Deferred Shareholders' Appeal Dismissed

IN the Court of Appeal on Monday, the Master of the Rolls and Lord Justice Romer and Mr. Justice Clauson commenced the hearing of the appeal by the group of the deferred shareholders of Imperial Chemical Industries, Ltd., from a judgment of Mr. Justice Eve, sitting in the Chancery Division, approving the reorganisation of capital put forward by the company.

Imperial Chemical Industries, Ltd., put forward a scheme which involved the reduction of capital from £95,000,000 to £89,565,859, the extinction as a class of the deferred shares of 10s. each, and the offer to the holders of these shares of one ordinary £1 share for every four shares.

The petition of the company was opposed by a committee representing 13,296 holders of 4,435,521 deferred shares, who alleged in the Court below that the scheme was unnecessary and uncalled for, as not a single penny of capital had been lost and that it was unfair to them.

They also alleged that no separate meeting of the deferred shareholders had been held, as required by the articles, and that all the material facts were not disclosed.

Mr. Justice Eve held that he was satisfied that it was his duty to confirm the resolutions for reduction put forward by the company. The committee opposing the scheme now appealed from that judgment.

Mr. H. J. Wallington, K.C., for the appellants, stated that the reduction of capital was an essenial part of a scheme for amalgamation of two classes of shares. The directors desired to get rid of the deferred shares as a separate class and to have only ordinary shares. The effect of the scheme if it went through was this, that the deferred shareholders lost half of their capital. They would also lose their special voting right—the right to be consulted as a separate class—and they would also lose half of their ordinary voting rights, so that their power in the company would be seriously affected, and their capital also. One of the compensations that the directors held out to the deferred shareholders was that when they become ordinary shareholders they would no longer be confined to the fixed 7 per cent., but would share in whatever dividend was declared. To that extent it was urged they would be better off.

Mr. Wallington said various questions arose on the appeal. One was whether Clause 44 of the articles of association was wide enough to confer a right to reduce the capital, which was vital to the validity of the whole scheme. Another question would be whether the separate class meetings were properly held, which was vital to the jurisdiction of the Court to confirm the scheme. The point about that was that instead of having separate meetings all the shareholders were there together. There was really only one meeting for three purposes. Counsel said his contention was that separate meetings had not been held.

Continuing, Mr. Wallington said there was not and there never had been the slightest suggestion of want of good faith on the part of the directors. There was no suggestion either as to the method by which they launched the scheme. There was no complaint that too much money had been set aside for the reserve, and there was no complaint as to the policy of the directors, nor with regard to any other matter in relation to the business side of the company.

What the appellants felt was most important was the effect of withdrawing 5½ million pounds from the ownership of the deferred shareholders to put it into the free hands of the company. The view of the appellants was that the directors, as part of their scheme to simplify the capital structure of the company as a matter of mere convenience, if this order remained, would have established a precedent whereby, for that purpose only, the company took out of the pockets of one set of shareholders a very large sum and devoted it to the purposes of the other shareholders. It was not suggested that any capital had been lost or was unrepresented by assets. The serious question here was whether this scheme was in the interests of the deferred shareholders.

He contended that the scheme was one of mere convenience and nothing else.

On Tuesday the court, without calling upon counsel for the respondents, dismissed the appeal with costs.

# New Dyestuffs

### A Light Fast Blue for Casement Cloth

CALEDON Brilliant Blue 2RC yields shades slightly redder and brighter than those obtained by the use of the older and well-known brand, Caledon Blue RCS. It is suitable for the dyeing of casement cloths and yarns of cotton and viscose which are required to be fast to light, washing and bleaching. Shades dyed with it withstand both chlorine and peroxide bleaching, provided that the normal precautions are taken. Any greening in shade which may occur through too drastic bleaching can be corrected by a rapid treatment in warm dilute sodium hydrosulphite solution. Caledon Brilliant Blue 2RC can also be used for the dyeing of cotton or viscose acetate silk unions by the Beta Naphthol process, although it is not considered to be so satisfactory in this respect as Caledon Brilliant Blue 3GS.

### A Blue for Tinting Vat Dyed Effects

Soledon Blue 2RCS possesses very good to excellent fastness properties and, since its solubility in water is very good, it is possible to obtain shades, particularly as regards penetration and levelness, which are difficult to obtain with vat dyestuffs. On account of these very good properties, it is eminently suitable for the padding of linen piece goods, mercerised poplin, cotton limbrics, viscose-cotton mixed fabrics, weighted and unweighted silk and materials which are difficult to penetrate in pale shades. Owing to the fact that no reduction process is required for its application, Soledon Blue 2RCS is specially recommended for the tinting of materials containing vat or azoic dyed effect threads or woven stripes for the production of pale coloured ground shades, and for the topping of azoic dyed shades. It is not recommended for dyeing other than for the palest shades. Soledon Blue 2RCS possesses excellent printing properties and can be printed at any depth of shade by the nitrite, sulphocyanide or Soledon Developer processes and, although not dischargeable, it may be resisted satisfactorily by means of Soledon Resist A. This dyestuff is suitable for the direct printing of weighted and unweighted silk.

### Two Red Colours of a New Range

Solacet Fast Scarlet BS is the first member of an entirely new range of products for the dyeing of acetate silk. These new dyestuffs, which are marketed in powder form, possess the outstanding property of being water soluble; the solubility of Solacet Fast Scarlet BS being of the order of 20 per cent. hot and 1 per cent. cold. By virtue of its solubility, together with its freedom from marking off on steaming, Solacet Fast Scarlet BS is eminently suitable for direct printing on acetate silk materials, yielding level and regular results—especially in pale and mode shades. It is of special interest for the printing of pile fabrics where trouble is liable

to occur when dispersed insoluble acetate silk dyestuffs are used in mixture shades. Solacet Fast Scarlet BS is suitable for dyeing all forms of acetate silk, possessing very good affinity for the fibre when dyed with the addition of common salt or Glauber's salt. It is of particular interest for the dyeing of heavy crêpes and materials of similar texture, where good penetration is highly desirable. Ground shades dyed with Solacet Fast Scarlet BS can be discharged to a good white by the Formosul-calcium or zinc sulphocyanide process or by the Reduzol Z process. Solacet Fast Scarlet BS may be applied in conjunction with Duranol and Dispersol dyestuffs, without special precautions, for the production of mode shades and with CR Chlorazol dyestuffs for the production of two coloured effects on mixed fibres, provided common or Glauber's salt is added to the dyebath.

Solacet Fast Crimson BS is eminently suitable for direct printing on acetate silk material, yielding level and regular results, especially in pale and mode shades. It is of special interest for the printing of pile fabrics, where trouble is liable to occur when dispersed insoluble acetate silk dyestuffs are used in mixture shades, and is suitable for dyeing all forms of acetate silk, possessing very good affinity for the fibre when dyed with the addition of common or Glauber's salt. It is of particular interest for the dyeing of heavy crêpe and material of similar texture where good penetration is highly desirable, as the penetration and exhaustion can be controlled by the addition of salt to the dyebath, in a similar manner to that used when direct cotton dyestuffs are applied to cotton. Ground shades, dyed on acetate silk with Solacet Fast Crimson BS can be discharged to a good white by the Formosul-calcium (or zinc) sulphocyanide process or by a process employing Redusol Z. Solacet Fast Crimson BS may be applied in conjunction with Duranol and Dispersol dyestuffs for the production of mode shades and with CR Chlorazol dyestuffs for the production of two-coloured effects on mixed fibres, provided common or Glauber's salt is added to the dyebath, the Duranol and Dispersol dyestuffs being unaffected by these additions to the dyebath. Compared with Dispersol Fast Crimson BS, Solacet Fast Crimson BS is equal in shade and general fastness properties, including light.

# Very Low Temperatures in Industry

A SPECIAL exhibition at the Science Museum, South Kensington, London, is concerned with the production and use of very low temperatures. This is the most difficult subject yet tackled in a series of displays designed in a popular way to bridge the gap between laboratory work and commercial practice. Low temperature separation is now employed to recover argon, belium and neon from the air, thus forming a first link in a chain that leads to gas-filled electric lamps and discharge tubes. Considerable research is going on into the effects produced by such low temperatures on familiar substances. Some metals become supra-conductive to electricity at very low temperatures, and some non-magnetic alloys can be magnetised. Phenomena of this type is being demonstrated at this exhibition. Three exhibits typical of the industrial application of very low temperatures are illustrated. Fig. 1 shows a small Hampson air liquefaction plant with a capacity of 4 litres of liquid air per hour. High pressure air, from which the carbon dioxide and water vapour have been removed, is led from a compressor to this apparatus. Oxygen is now being stored and transported in the liquid form in large quantities. Liquid oxygen containers (Fig. 2) may be carried on a lorry or a railway wagon, or erected in the factory where the oxygen is to be used. Such a container consists essentially of two parts, one inside the other and separated by a non-inflammable insulating material such as magnesium carbonate or slag wool. When transferred to an evaporator of the type shown in Fig. 3, the liquid is converted into a gas which may then be used for industrial purposes, some of the gas being stored in high-pressure cylinders.

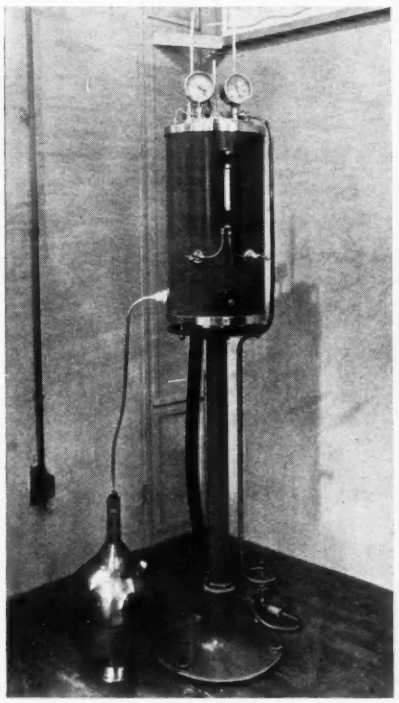

**Fig. 1.—Air Liquefaction Plant.**

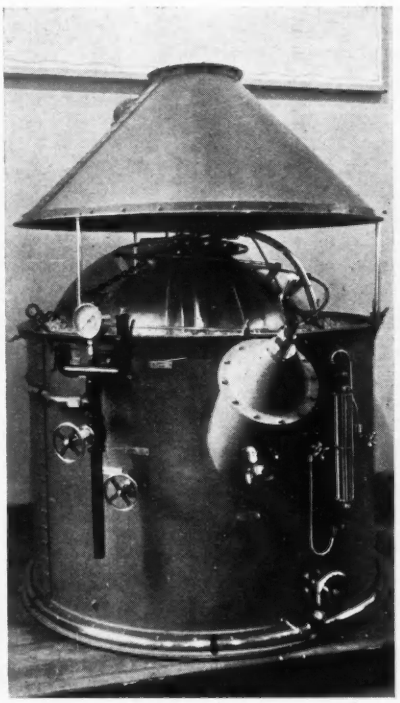

**Fig. 2.—Liquid Oxygen Container.**

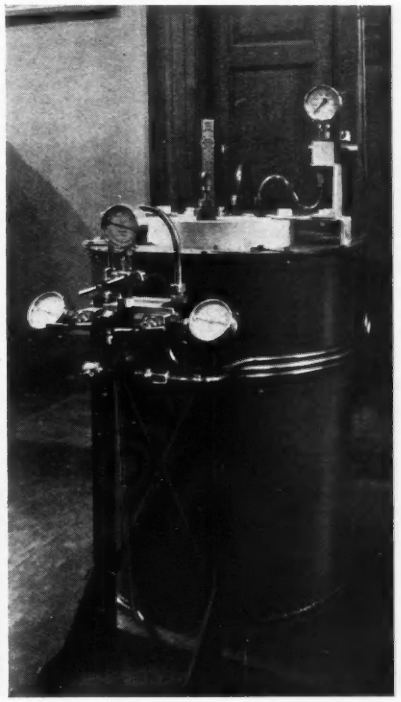

**Fig. 3.—Oxygen Evaporator.**

# Low-Grade Olive Oil

### A Lubricant for Internal Combustion Engines

RECENT experiments in France, and especially in Algeria, have shown that the lower grades of olive oil, if mixed in suitable proportions with mineral oil, can be used as a satisfactory lubricant for petrol engines. The Station de Génie Rural, Algeria, carried out an exhaustive series of experiments, both at the bench and in actual motor car trials with a mixture consisting of 75 per cent. mineral oil (exact kind not stated) and 25 per cent. olive oil of industrial or non-edible grade. The results ("Bull, des Mat. Grasses," 1936, No. 1, 11) are said to have been entirely satisfactory, except that there was a rather considerable amount of deposit. The engines started up more easily and there were even small increases in power developed, up to about 10 per cent. This latter was, however, due to fluidity and not necessarily to the olive oil; for a mineral oil of similar low viscosity also showed a slight increase in power developed. There was also less action on metal parts and therefore less wear, no increase in sensitivity to cold, and good tolerance for colloidal graphite. The difficulties in the way of commercial exploitation of such a mixture, preferably by the big oil companies, are discussed.

# Long Service Awards

### I.C.I. Presentations at Widnes

TWENTY-TWO employees of Imperial Chemical Industries, Ltd., received long service awards at the Pilkington-Sullivan annual works social held at the I.C.I. (Widnes) recreation club on February 28, bringing the total recipients since 1928 up to 624. The awards were as follows: Gold medal (40 years' service): Mr. Pierce Tallon, Mr. J. H. Pope; gold watch (35 years' service): Messrs. David Broome, A. Stanley Davies, J. J. Monaghan, P. Smith, Jack Stott, T. Tansey, W. White, A. Watkin; silver watch and medal (25 years' service): Messrs. B. Angove, Jack Beard, W. Eyres, T. Howard, H. Hutton, W. J. Jackson, E. Lines, A. Parkinson, W. F. Ramsay, E. G. Smith, E. Withington, I. Wright.

The presentations were made by Mr. J. G. Nicholson, a director of Imperial Chemical Industries, Ltd., who referred to the good feeling existing among the company's employees. They were, he said, all working together, and were working as a team, and it was the team spirit that counted. As a team they knew they had to play against other teams in competition. As long as the best team won, he was quite content, because he knew that the best team was I.C.I. every time.

# Steel Corrosion Problems

### Protection by Painting

THE corrosion problem in steel was the subject of a paper read by Dr. McCance, managing director of Colvilles, Ltd., at a meeting of the Institution of Engineers and Shipbuilders in Scotland at Glasgow last week. He said that if corrosion experiments were carried out in a closed vessel, so that the amount of oxygen absorbed by the corrosion could be measured, a convenient way of studying the process was arrived at, and that had been the method adopted by Dr. Bengough and his co-workers at the Chemical Research Laboratory, Teddington. He proceeded to deal with the effect of composition, copper, the oxygen supply, the formation of protective films, and the effect of mill scale. With reference to protection by painting, he added that however much the scientific study of corrosion had progressed our practical knowledge retained its primitive simplicity, and was guided by the single axiom that all mild steels immersed in water corroded unless they were protected by painting or some other surface treatment. Scientific information concerning the action of paints was still meagre and empirical.

# International Congress on Glass

### Forthcoming Meetings in London and Sheffield

AT the invitation of the Society of Glass Technology, the Second International Congress on Glass will be held in England from July 2 to 11. The meetings will be held for the most part in London, with headquarters at the Institution of Mechanical Engineers, and the remainder in Sheffield. The plan for the Congress provides for two full days for the reading of papers in full sessions, and several days for the discussion, in several groups, of a selected number of subjects of wide interest to glass technologists.

The arrangements for the technical programme have been made by the International Commission on Glass set up at Milan in 1933. In its work the commission has received whole-hearted help from the American Ceramic Society, the Deutsche Glastechnische Gesellschaft, and the Society of Glass Technology, as well as from interested groups in other countries. The arrangements are now in course of development by a British organising committee assisted by national committees in a number of different countries.

# Potash Industry in 1935

### Renewed Development of World Sales

THE year 1935 was marked by a renewed development of world consumption of potash salts, and deliveries by the principal producers show a decided increase over the previous year, which had already shown an improvement over the year 1932. It was estimated that world deliveries of potash during 1935 would total more than 2,000,000 metric tons of pure potash. In 1930, the record year, the total world tonnage of potash extracted amounted to 2,037,000 metric tons of $K_2O$ and in 1913, the record pre-war year, 1,100,000 tons. In contrast with recent world improvement, the 1935 sales by the Alsatian mines have shown a further decrease when compared with the previous season, a result of the severe crisis in French agriculture, and also due to the fact that fertiliser dealers, who are also suffering from the effects of the general crisis, are no longer able to extend credit to the farmers. With a view of improving this situation, the French potash industry made substantial price decreases during the last two years.

# Chemical Formula Set to Music

### A Novel Lecture-Recital

A CHEMICAL formula written in Latin and set to music was one of the remarkable songs sung by St. Andrews University choir at a novel lecture-recital held by the Musical Club at University College, Dundee. The lecturer was Professor John Read, professor of chemistry at St. Andrews, who spoke on "A Musical Alchemist."

The musical alchemist referred to was Count Michael Maier, born in 1568, who, besides being an alchemist, was also a philosopher and musician. Among the most interesting features of the declining years of alchemy in the middle ages, said the lecturer, were its illustrations and emblems. A book published by Maier at Oppenheim, near Frankfort, contained emblems pictures with Latin epigrams. The epigrams were in couplets and set to music, apparently by the versatile author.

Mr. F. W. Sawyer, lecturer in music at St. Andrews University, explained the "alchemist music" from Maier's book, samples of which were sung by the choir of 15 students under Mr. Sawyer's direction. As a final item the students sang a modern epigram framed on Maier's model by Professor H. J. Rose, of the Chair of Greek, and set to music by Mr. Sawyer. This was entitled "Hydrogenesis," and the words of the Latin couplet gave the chemical composition of water.

# The British Association of Chemists

## London Section Dinner and Dance

THE annual dinner and dance of the London Section of the British Association of Chemists was held at the Waldorf Hotel, London, on March 7. The chair was taken by Mr. G. T. Gurr (chairman of the London Section), and among those present were Sir Reginald Craddock, M.P., Mr. W. A. Damon (Chief Inspector under the Alkali Acts), Professor E. C. C. Baly, F.R.S. (president of the Association), Mr. C. S. Garland (chairman of council), Mr. S. Reginald Price (past president), Professor A. G. Green (vice-president), Mr. H. J. Pooley (secretary, Society of Chemical Industry), Mr. J. Davidson Pratt (general manager and secretary, Association of British Chemical Manufacturers), Dr. E. F. Armstrong, F.R.S., Professor G. T. Morgan, F.R.S. (past-president), Miss Wright (hon. secretary, London Section), and Mr. C. B. Woodley (general secretary of the Association).

**The British Association of Chemists (London Section) Annual Dinner at the Waldorf Hotel on March 7.**

Dr. E. F. ARMSTRONG proposed the toast of "Chemistry and the British Association of Chemists," and in coupling the name of Mr. S. Regianld Price with it said it always seemed to him that Mr. Price was really the British Association of Chemists. He added that in the days to come when White Papers were translated into action and chemists were all organised and regimented, the nick-name of the B.A.C. would surely be "Price's Own"! Speaking seriously, Dr. Armstrong said the Association as a body could pride itself on having passed, during the year, another stage on that endless road towards the future which all chemists dreamed about. Undoubtedly the Association had progressed and justified the work it was doing. At the same time it was not easy to progress in this world which was a hard and unkind one. If one was fortunate enough to do a good deed it counted for very little whilst if one was unfortunate enough to make any mistakes, it counted for a great deal. It was not easy to go on year after year without committing some errors of judgment, but it could be said that the Association had been singularly free from committing errors. Those who had presided over its destinies had always acted wisely with the result that the Association and its work had gone forward. He advised them all to "look before you leap" and to weigh the consequences of any action that might be taken because they were now sufficiently old to have something to lose and could not, as they did when they were young, risk everything. The members owed a great deal to those who had guided the Association since its commencement and also to the indefatigable Miss Wright for her work as hon. secretary of the London Section. The Association grew larger and more prosperous and successful and he hoped it would long continue to do so.

Mr. S. REGINALD PRICE, responding to the toast, said that Dr. Armstrong had been a great friend to the Association from the beginning and the fact that it was growing in strength from year to year was in no small measure due to the interest which Dr. Armstrong took in the work. When it was said, however, that he himself was really the Association, Dr. Armstrong was quite wrong, because the work of the Association was almost entirely done by the various honorary officials, and it was the work of the members of council and the officials of the local sections which had made for the success of the Association. All that work had been voluntary work, but it had been done with the same zest and the same interest as if it had been a £2,000 a year task—and there were not many chemists who got more than that. In addition, there was the extraordinarily able work done at the head office by the permanent staff. Those outside the council did not know the enormous amount of time put in by the staff beyond their legitimate hours.

Professor E. C. C. BALEY, proposing "The Guests," with which he coupled the names of Sir Reginald Craddock, M.P., and Mr. W. A. Damon (chief inspector under the Alkali Acts), said his first acquaintance with Sir Reginald was when he was first elected a member of Parliament for the Combined English Universities, and he himself was chairman of the Conservative and Unionist Association in the University of Liverpool. On that occasion Sir Reginald did what he believed no other similar prospective member of Parliament had ever done before, *viz.*, he visited all the universities in his constituency. Before then, Sir Reginald had been one of the most distinguished officials in the British Civil Service in that he had been Governor of two provinces in India, where he had shown his great qualities as an administrator. Speaking of Mr. Damon, he said that although he had not the slightest idea of the duties of the Alkali Inspector he believed the Government of the day first appointed inspectors of alkali entirely to save the alkali business because they learned for the first time that it was worth while recovering

hydrochloric acid and selling it. Although that was a Government move, the Government did not really know anything about it.

Sir REGINALD CRADDOCK responded to the toast and said he had no qualifications to speak because he was not a chemist. At the same time he said he recognised the valuable work which the Association was doing although to his regret he found that mixed up with that work was a very intense desire to make poisons. Nevertheless, it was evident to all who kept abreast of the progress of the world that the profession of chemistry was one of the most important, if not the most important, in this country and in a great many others.

Mr. W. A. DAMON also briefly replied.

The remaining toast was that of "The Chairman," which was proposed by Mr. C. S. Garland, and was acknowledged by the chairman in three words.

# Personal Notes

MR. F. S. BRIDSON JONES, B.A., of Clare College, Cambridge, has been appointed assistant to Sir William J. Pope for two years from January 1 last.

MR. HENRY SMITH PROCTOR, a director of the Walsden Bleaching and Dyeing Co., Ltd., near Todmorden, Lancashire, died on March 4. He was a native of Bolton and leaves a widow, daughter and three sons.

MR. E. N. GARDNER, managing director of Crosfields Oil and Cake Co., has resigned his seat on the board and Mr. T. B. JOB has been appointed chairman and managing director.

DR. THOMAS J. MURRAY, principal of the Constantine Technical College, Middlesbrough, died at his home at Middlesbrough on March 6. He was 56 years old. For the past two years or so he has lectured on metallurgical subjects at the Board of Education vacation courses at Oxford and for seven years was principal of Smethwick Municipal College. Dr. Murray was also lecturer and demonstrator in chemistry at Glasgow Royal Technical College and at Birmingham University, and was head of the chemistry and metallurgical department of Wolverhampton Technical College before and after the war.

PROFESSOR JOHN SCOTT HALDANE, honorary director of the Mining Research Laboratory, Birmingham, and Gas Referee to the Board of Trade, is ill at his home at Oxford with bronchial pneumonia. Professor Haldane is 76.

SIR RICHARD TETLEY GLAZEBROOK, F.R.S., of Ballards Oak, Limpsfield, Surrey, for twenty years head of the National Physical Laboratory, who died on December 15 last, aged 81 years, left estate of the gross value of £30,835 (net personalty £28,268).

MR. JOHN REGINALD BLOCKEY has been appointed as principal of the Leathersellers' Technical College in succession to Mr. M. C. Lamb, who is retiring at the end of the current session. From 1909 to 1913 Mr. Blockey was on the staff of the Leathersellers' College as lecturer in the applied science of leather manufacture.

At a meeting of the Board of the Institute of Physics held on Tuesday the following were elected to membership:—Fellows: R. T. Dunbar, T. L. Ibbs, J. P. V. Madsen and W. E. Williams; associates: J. Cates, H. E. Gauss, T. A. Littlefield, M. McCaig, E. M. Payne, G. D. Robinson and H. M. Smith; ordinary member: R. B. Bourdillon; students: D. W. Davison, C. F. Machin and R. A. Scott.

# Continental Chemical Notes

## Roumania

A GLYCERINE PLANT IS BEING INSTALLED in the paint and varnish factory of Carol Zimmer and Co.

## Hungary

A NEW CARBON BISULPHIDE PLANT, built at Pét by the Pét Artificial Fertiliser Works, is expected to cope with the requirements of the entire home market and leave a surplus for export.

## Belgium

A NEW CHEMICAL MANUFACTURING COMPANY, Etablissements Houbron et Cie (capital 500,000 francs), has been established in Brussels, with participation of Soc. d'Applications de Chimie Industrielle and Soc. Générale des Minerals.

## Italy

AMONG NEW CHEMICAL DEVELOPMENTS for which permits have been granted are the following: Extension of a carbon bisuphide factory at Turin (Snia Viscosa), erection of a paper works at Tolentino (Rag. Guiseppe Gabrieli), erection of a new plant for high-resistance light metal alloys at Turin (Soc. An. Trafilati).

PLANS HAVE BEEN SUBMITTED TO THE GOVERNMENT by a private group for a vast oil refinery (2 million tons capacity) at Bovisa, near Milan, which would be supplied with crude oil by direct pipe-line from Geneva. By an arrangement with the gasworks of the Società Italiana Edison, petroleum gases separated during refinement could be supplied to the Milan Municipality in place of coal gas.

## Russia

IMPENDING LARGE-SCALE CULTIVATION of the guayala rubber plant on collective farms in Russian Central Asia is reported from Taschkent ("Chemische Industrie").

## Czechoslovakia

AS ANNOUNCED IN THE PRAGUE JOURNAL, "Wirtschaft," a new medicinal chemical firm is being established under the style of Organochemie A.-G. (capital 10 million crowns). One of the founders is a director of the Nestomitz Sugar Refinery. Among the chemicals in the firm's programme are ethyl p-amino-benzoate and dimethylaminophenyldimethylpyrazolone (antipyrin). Estimates of the annual home consumption of the latter medicament range from 2 to 4,000 lb.

## France

A NEW PROCESS FOR AUGMENTING the filtering and decolorising efficiency of bleaching earths (French Pat. 791,148) is based upon the observations that dispersion of a bleaching earth in water is most thorough when the *p*H of the medium is nine, that the filtering efficiency is a function of the quantity of gelatinous silica in the material, and that the decolorising power is a function of the amorphous silica content. It is consequently proposed to subject bleaching earths to physical, chemical and physico-chemical treatment with a view to depositing silica in the interior of the mass. A hallyositic clay, for example, is treated in suspension in boiling water with sufficient alkali silicate to produce a *p*H of about nine, whereupon the homogeneous milk is acidified while boiling in order to precipitate silica.

# Weekly Prices of British Chemical Products

THERE are no changes to report in the market prices of heavy chemicals, rubber chemicals, wood distillation products, pharmaceutical and photographic chemicals, essential oils and intermediates. In the coal tar products section there has been an all-round decrease of from half-penny to a penny per gal. in the prices of benzol, toluol and xylol. Unless otherwise stated the prices below cover fair quantities net and naked at sellers' works.

LONDON. — In the London chemical market prices remain steady and a fair general demand is reported.

MANCHESTER.—Quotations have been generally steady on the Manchester chemical market during the past week, and except in one or two odd sections there has been little indication of prices giving way. There is a continued steady inquiry about for deliveries against contracts, although with room for appreciable improvement in cotton trade conditions the consumption of the heavy products, more especially, in the Lancashire area is not so satisfactory as it should be in the aggregate. Apart from the bleaching and dyeing industries' requirements, however, the movement of supplies in most other directions is well maintained. Buying interest during the past week has been on a moderate scale, with a sprinkling of new orders for comparatively early delivery positions for home users. On export account the demand locally has been on rather quiet lines.

SCOTLAND.—There has been a slight improvement in the demand for chemicals for home trade during the week, though export business remains very limited. Prices generally continue firm at about previous figures with only slight changes to report compared with last week.

### Price Changes

**Coal Tar Products.**—BENZOL, crude, 8½d. to 9d. per gal.; standard motor, 1s. 2d. to 1s. 2½d.; 90%, 1s. 3d. to 1s. 3½d.; pure, 1s. 7d. to 1s. 7½d. TOLUOL, 90%, 2s. 3d. per gal.; pure, 2s. 7d. XYLOL, commercial, 2s. 3d. per gal.; pure, 2s. 5d.

**All other prices remain unchanged.**

## General Chemicals

ACETONE.—LONDON: £62 to £65 per ton; SCOTLAND: £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—40% technical, £17 15s. per ton. LONDON: Tech., 80%, £33 5s. to £35 5s. per ton; pure 80%, £35 5s. to £37 5s.; tech., 40%, £17 15s. to £19 15s.; tech., 60%, £25 15s. to £27 15s. SCOTLAND: Glacial 98/100%, £48 to £52; pure 80%, £39 5s.; tech., 80%, £38 5s., d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £37 5s.; tech. glacial, £50.

ACID, BORIC.—Commercial granulated, £27 per ton; crystal, £28; powdered, £29; extra finely powdered, £31; packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. B.P. cryst., £36; B.P. powder, £37. SCOTLAND: Crystals, £28; powdered, £29.

ACID, CHROMIC.—10½d. per lb., less 2½%, d/d U.K.

ACID, CITRIC.—11¾d. per lb. MANCHESTER: 1s. SCOTLAND: 11¾d.

ACID, CRESYLIC.—97/100%, 1s. 5d. to 1s. 6d. per gal.; 99/100%, refined, 1s. 9d. to 1s. 10d. per gal. LONDON: 98/100%, 1s. 5d. f.o.r.; dark, 1s.

ACID, FORMIC.—LONDON: £42 to £47 per ton.

ACID, HYDROCHLORIC.—Spot, 4s. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works. SCOTLAND: 80°, £24 ex station full truck loads.

ACID, OXALIC.—LONDON: £47 17s. 6d. to £57 10s. per ton, according to packages and position. SCOTLAND: 98/100%, £48 to £50 ex store. MANCHESTER: £48 10s. to £54 ex store.

ACID, SULPHURIC.—SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—1s. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. LONDON: 11½d., less 5%. SCOTLAND: 1s. 0½d. less 5%. MANCHESTER: 1s. per lb.

ALUM.—SCOTLAND: Lump potash, £8 10s. per ton ex store.

ALUMINA SULPHATE.—LONDON: £7 10s. to £8 per ton. SCOTLAND: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £30 per ton; powdered, £33, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—LONDON: Fine white crystals, £18 to £19. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM SULPHATE.—Neutral quality, 20.6% nitrogen, £7 per ton.

ANTIMONY OXIDE.—SCOTLAND: £61 to £65 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 1d. per lb.; crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality.

ARSENIC.—LONDON: £15 per ton c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND: White powdered, £23 ex wharf. MANCHESTER: White powdered Cornish, £21, ex store.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARIUM CHLORIDE.—LONDON: £10 10s. per ton. SCOTLAND: £10 10s. to £10 15s.

BARYTES.—£6 10s. to £8 per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot, 35/37%, £7 19s. per ton d/d station in casks, special terms for contract. SCOTLAND: £9 5s.

BORAX, COMMERCIAL.—Granulated, £14 10s. per ton; crystal, £15 10s.; powdered, £16; finely powdered, £17; packed in 1-cwt. bags, carriage paid home to buyer's premises within the United Kingdom in 1-ton lots.

CADMIUM SULPHIDE.—5s. 3d. to 5s. 6d. per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums.

CARBON BISULPHIDE.—£31 to £33 per ton, drums extra.

CARBON BLACK.—3¾d. to 4¼d. per lb. LONDON: 4¼d. to 5d.

CARBON TETRACHLORIDE.—SCOTLAND: £41 to £43 per ton, drums extra.

CHROMIUM OXIDE.—10¾d. per lb., according to quantity d/d U.K.; green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 2⅝d. per lb.; liquor, £19 10s. per ton d/d

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—£3 19s. per cwt. less 2½%. LONDON: £3 17s. per cwt. SCOTLAND: £3 16s. 6d. net.

DINITROTOLUENE.—66/68° C., 9d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON: £24 10s. per ton. SCOTLAND: 40%, £25 to £28 ex store.

IODINE.—Resublimed B.P., 6s. 3d. to 8s. 4d. per lb.

LAMPBLACK.—£45 to £48 per ton.

LEAD ACETATE.—LONDON: White, £36 10s. per ton; brown, £1 per ton less. SCOTLAND: White crystals, £34 to £35; brown, £1 per ton less. MANCHESTER: White, £36; brown, £35.

LEAD NITRATE.—£32 10s. to £34 10s. per ton.

LEAD, RED.—SCOTLAND: £25 to £27 per ton less 2½%; d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £39 per ton, carriage paid. LONDON: £41.

LITHOPONE.—30%, £16 to £16 10s. per ton.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £7 per ton.

MAGNESIUM SULPHATE.—Commercial, £5 per ton, ex wharf.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

PHENOL.—6¾d. to 7¼d. per lb. to June 30, 1936.

POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £39.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. less 5%, d/d U.K. Ground, 5¼d. LONDON: 5d. per lb. less 5%, with discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports. MANCHESTER: 5d.

POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 99¾/100%, powder, £37. MANCHESTER: £38 10s.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

POTASSIUM IODIDE.—B.P., 5s. 2d. per lb.

POTASSIUM NITRATE.—SCOTLAND: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8¾d. per lb. SCOTLAND: B.P. crystals, 10d. to 10½d. MANCHESTER: B.P., 11½d.

POTASSIUM PRUSSIATE.—LONDON: Yellow, 8¼d. to 8¾d. per lb. SCOTLAND: Yellow spot, 8½d. ex store. MANCHESTER: Yellow, 8½d.

SALAMMONIAC.—First lump spot, £41 17s. 6d. per ton d/d in barrels. SCOTLAND: Large crystals, in casks, £36.

SODA ASH.—58% spot, £5 12s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £13 17s. 6d. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 12s. 6d. in drums; 70/73%,

£14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 contracts.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—LONDON: £21 per ton. SCOTLAND: £20 15s.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 15s. ex quay or station. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount 5%. Anhydrous, 5d. per lb. LONDON: 4d. per lb. less 5% for spot lots and 4d. per lb. with discounts for contract quantities. MANCHESTER: 4d. per lb. basis. SCOTLAND: 4d. delivered buyer's premises with concession for contracts.

SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1 cwt. iron drums for home trade.

SODIUM CARBONATE, MONOHYDRATE.—£15 per ton d/d in minimum ton lots in 2 cwt. free bags. Soda crystals, SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality, 7s. 6d. per ton extra. Light Soda Ash, £7 ex quay, min. 4-ton lots with reductions for contracts.

SODIUM CHLORATE.—£30 per ton. SCOTLAND: 3¾d. per lb.

SODIUM CHROMATE.—4d. per lb. d/d U.K.

SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £14 10s. ex station, 4-ton lots. MANCHESTER: Commercial, £10 5s.; photographic, £14 10s.

SODIUM METASILICATE.—£14 per ton, d/d U.K. in cwt. bags.

SODIUM IODIDE.—B.P., 6s. per lb.

SODIUM NITRITE.—LONDON: Spot, £18 5s. to £20 5s. per ton d/d station in drums.

SODIUM PERBORATE.—10%, 9¼d. per lb. d/d in 1-cwt. drums. LONDON: 10d. per lb.

SODIUM PHOSPHATE.—£13 per ton.

SODIUM PRUSSIATE.—LONDON: 5d. to 5¼d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 5d. to 5½d.

SODIUM SILICATE.—140° Tw. Spot, £8 per ton. SCOTLAND: £8 10s.

SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d SCOTLAND: English material, £3 15s.

SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 12s. 6d. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 2s. 6d. to £3 5s.

SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 7s. 6d., d/d buyer's works on contract, min. 4-ton lots. Spot solid, 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 2s. 6d.

SODIUM SULPHITE.—Pea crystals, spot, £13 10s. per ton d/d station in kegs. Commercial spot, £8 15s. d/d station in bags.

SULPHUR.—£9 10s. to £9 15s. per ton. SCOTLAND: £8 to £9.

SULPHATE OF COPPER.—MANCHESTER: £15 per ton f.o.b.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.

SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.

VERMILION.—Pale or deep, 5s. 1d. per lb. in 1-cwt. lots.

ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.

ZINC SULPHATE.—LONDON: £12 per ton. SCOTLAND: £10 10s.

ZINC SULPHIDE.—10d. to 11d. per lb.

## Nitrogen Fertilisers

SULPHATE OF AMMONIA.—£7 5s. per ton for neutral quality basis 20.6% nitrogen delivered in 6-ton lots to farmer's nearest station.

CALCIUM CYANAMIDE.—March, £7 3s. 9d. per ton; April/June, £7 5s., delivered in 4-ton lots.

NITRO-CHALK.—£7 5s. per ton delivered in 6-ton lots to farmer's nearest station.

NITRATE OF SODA.—£7 12s. 6d. per ton delivered in 6-ton lots to farmer's nearest station.

CONCENTRATED COMPLETE FERTILISERS.—£10 10s. to £10 19s. per ton according to analysis, delivered in 6-ton lots to farmer's nearest station.

AMMONIUM PHOSPHATE (N.P.) FERTILISERS.—£10 5s. to £13 15s. per ton according to analysis, delivered in 6-ton lots to farmer's nearest station.

## Coal Tar Products

ACID, CRESYLIC.—99/100%, 2s. to 2s. 9d. per gal., according to specification; pale 98%, 1s. 10d. to 1s. 11d.; dark, 1s. 6d. to 1s. 7d. LONDON: 98/100%, 1s. 4d.; dark, 95/97%, 1s. SCOTLAND: Pale, 99/100%, 1s. 3d. to 1s. 4d.; dark, 97/99%, 1s. to 1s 1d.; high boiling acid, 2s. 6d. to 3s.

ACID, CARBOLIC.—Crystals, 6¾d. to 7¼d. per lb.; crude, 60's, 1s. 11½d. to 2s. 2½d. per gal. MANCHESTER: Crystals, 7¼d. per lb.; crude, 2s. 1d. per gal. SCOTLAND: 60's, 2s. 6d. to 2s. 7d.

BENZOL.—At works, crude, 8½d. to 9d. per gal.; standard motor 1s. 2d. to 1s. 2½d.; 90%, 1s. 3d. to 1s. 3½d.; pure, 1s. 7d. to 1s. 7½d. LONDON: Motor, 1s 3½d. SCOTLAND: Motor, 1s. 6½d.

CREOSOTE.—B.S.I. Specification standard, 5½d. per gal. f.o.r. Home, 3¾d. d/d. LONDON: 4½d. f.o.r. North; 5d. London. MANCHESTER: 4½d. to 5¼d. SCOTLAND: Specification oils, 4d.; washed oil, 4½d. to 4¾d.; light, 4½d.; heavy, 4½d. to 4¾d.

NAPHTHA.—Solvent, 90/100%, 1s. 5½d. to 1s. 6½d. per gal.; 95/160%, 1s. 9d.; 90%, 1s. to 1s. 2d. LONDON: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. SCOTLAND: 90/160%, 1s. 3d. to 1s. 3½d.; 90/190%, 11d. to 1s. 2d.

NAPHTHALENE.—Crude, whizzed or hot pressed, £17 10s. per ton; purified crystals, £22 to £23 per ton in 2-cwt. bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 70s. to 75s.

PYRIDINE.—90/140%, 5s. 3d. to 8s. per gal.; 90/180, 2s. 3d.

TOLUOL.—90%, 2s. 3d. per gal.; pure, 2s. 7d.

XYLOL.—Commercial, 2s. 3d. per gal.; pure, 2s. 5d.

PITCH.—Medium, soft, 42s. 6d. to 43s. per ton, in bulk at makers' works. MANCHESTER: 38s. to 40s. f.o.b., East Coast.

## Latest Oil Prices

LONDON, March 11.—LINSEED OIL was steady. Spot, £28 15s. per ton (small quantities); March, £26 5s.; April, £26 7s. 6d.; May-Aug., £26 10s.; Sept.-Dec., £26 12s. 6d., naked. SOYA BEAN OIL was quiet. Oriental (bulk), March shipment, £21 5s. per ton, excluding duty. RAPE OIL was slow. Crude extracted, £34 10s. per ton; technical refined, £36, naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £24 per ton; refined common edible, £28; and deodorised, £30, naked, ex mill (small lots £1 10s. extra). TURPENTINE was unchanged. American spot, 43s. 6d. per cwt.

HULL.—LINSEED OIL, spot, quoted £26 7s. 6d. per ton; March and April, £26; May-Aug., £26 2s. 6d.; Sept.-Dec., £26 7s. 6d. COTTON OIL, Egyptian, crude, spot, £24 10s.; edible, refined, spot, £27 10s.; technical, spot, £27 10s.; deodorised, £29 10s., naked. PALM KERNEL OIL, crude, f.m.q., spot, £23 10s., naked. GROUNDNUT OIL, extracted, spot, £30 10s.; deodorised, £33 10s. RAPE OIL, extracted, spot, £33 10s.; refined, £35. SOYA OIL, extracted, spot, £26; deodorised, £29 per ton. COD OIL, f.o.r. or f.a.s., 25s. per cwt., in barrels. CASTOR OIL, pharmaceutical, 42s. 6d. per cwt.; firsts, 37s. 6d.; seconds, 35s. 6d. TURPENTINE, American, spot, 43s. 9d.

# Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

## Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt as specified in the last available Annual Summary, is also given marked with an *—followed by the date of the Summary, but such total may have been reduced.)

BRISWORTHY CHINA CLAY CO., LTD. (M., 14/3/36.) Registered February 27, £1,000 debenture to W. Thompson, Erinville, Pomphlett; general charge. *£1,000. December 28, 1935.

GRANGER CHEMICAL PROCESSES, LTD., Watford. (M., 14/3/36.) Registered February 29, £500 debentures; general charge.

MID-CORNWALL CHINA CLAY CO., LTD., St. Austell. (M., 14/3/36.) Registered February 12, £4,000 debentures; general charge. *£8,564. June 20, 1935.

### Satisfactions

CHEMICAL ENGINEERING AND WILTON'S PATENT FURNACE CO., LTD., London, S.W. (M.S., 14/3/36.) Satisfactions registered February 28, of debentures registered January 21, 1918, to extent of £500, the balance, and of debentures registered July 12, 1923, to extent of £1,250.

SUPER CLAY CO., LTD., St. Austell. (M.S., 14/3/36.) Satisfaction registered February 26, £8,850, registered October 2, 1933.

## County Court Judgments

(NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court Judgments against him.)

CLAYDENS, LTD., Ridyard Street, Little Hulton, Lancs., chemical manufacturers. (C.C., 14/3/36.) £10 6s. 6d. January 31.

# Chemical and Allied Stocks and Shares

CONDITIONS in the stock and share markets have been unsettled by European political developments, and as compared with a week ago many leading industrial shares have been lowered rather sharply. Shares of companies identified with the chemical and allied trades have reflected general market conditions, but there have been various strong features in cases where results are due shortly and where favourable dividend anticipations are current in the market. Associated Portland Cement, for instance, have continued prominently active, pending publication of the full results. The company has already announced an excellent increase in its dividend and it is naturally assumed there has been a marked advance in profits for the past year. Imperial Chemical Industries were in good demand on any reaction. William Blythe 3s. ordinary shares were bought at higher prices, expectations of a favourable increase in the final dividend having persisted. The 5½ per cent. preference shares of Monsanto Chemicals were very firm around 23s. 6d., having remained under the influence of the good results for the past year. Evans, Sons, Lescher and Webb is another chemical company which has issued results showing larger earnings. Borax Consolidated deferred have continued to hold nearly all their recent large advance, having continued to benefit from the statements made at the recent annual meeting as to the increasing uses of borax. Reckitt and Sons ordinary were very firm on the maintenance of the dividend for the year at 22½ per cent., while Goodlass Wall and Lead Industries held up well on the continued hopes that the dividend for the year may be raised to 7½ per cent. There was increased interest shown in shares of paint manufacturing companies, notably in Pinchin Johnson, there now being revived hopes that the forthcoming results of the latter company may show the raising of the dividend from 17½ per cent. to 20 per cent. Blythe Colour Works 4s. shares were well maintained. The market considers the dividend prospects of the company as very promising in view of the good earning capacity of the business. On the basis of last year's profits, earnings on the ordinary shares would work out at over 32 per cent., after allowing for the preference dividend. Burt, Boulton and Haywood were steady on the larger interim dividend of 3 per cent. (against 2 per cent.) which suggests that good recovery is being made from the set-back in profits of the previous year when it was necessary to take £25,000 from reserve in order to pay a dividend of 4 per cent. on the ordinary shares. British Glues and Chemicals have been very firm. There are anticipations in the market that the shares will re-enter the dividend list this year. British Drug Houses have been steady on the possibility of a rather larger dividend for the year. Distillers reacted, but this is probably due to general market conditions, with which most very active shares usually move closely. In this case the disposition is to look for either an increase in the dividend or some form of bonus. Unilever have moved against holders, largely owing to disappointment with the dividend decisions of some of the stores companies with which the company is associated. Boots Pure Drug continued to hold up well. Associated Dyers issues were under the influence of the loss shown for the past year's working. Courtaulds have reacted further on balance, but the belief in the market is that a good recovery is likely when general market conditions are more buoyant. Fison, Packard and Prentice held up well and Cooper, McDougall and Robertson were again maintained, pending publication of the past year's results. United Premier Oil and Cake were also steady, aided by the favourable dividend estimates which remain current. British Oil and Cake Mills preferred ordinary shares have responded to the excellent results for the past year. The lower price of British Oxygen is due in the main to the fact that the price is "ex" the bonus. Imperial Smelting held up well, aided by the further increase in the price of zinc. Oil shares have been dull and most of the leading shares came in for a good deal of profit-taking.

| Name. | March 10. | March 3. |
|---|---|---|
| Anglo-Iranian Oil Co., Ltd. Ord. | 91/10½ | 93/9 |
| ,, 8% Cum. Pref. | 36/9 | 36/- |
| ,, 9% Cum. Pref. | 37/9 | 37/- |
| Associated Dyers and Cleaners, Ltd. Ord. | 1/10½ | 1/10½ |
| ,, 6½% Cum. Pref. | 6/3 | 6/3 |
| Associated Portland Cement Manufacturers, Ltd. Ord. | 85/7½ | 87/- |
| ,, 5½% Cum. Pref. | 28/- | 28/- |
| Benzol & By-Products, Ltd. 6% Cum. Part. Pref. | 3/9 | 3/9 |
| Berger (Lewis) & Sons, Ltd. Ord. | 69/4½ | 70/- |
| Bleachers' Association, Ltd. Ord. | 6/3 | 6/3 |
| ,, 5½% Cum. Pref. | 11/3 | 11/10½ |
| Boake, A., Roberts & Co., Ltd. 5% Pref. (Cum.) | 20/- | 20/- |
| Boots Pure Drug Co., Ltd. Ord. (5/-) | 56/6 | 56/9 |
| Borax Consolidated, Ltd. Pfd. Ord. (£) | 112/6 | 115/- |
| ,, Defd. Ord. | 28/9 | 28/- |
| ,, 5½% Cum. Pref. (£10) | £11/15/- | £12 |
| ,, 4½% Deb. (1st Mort.) Red. (£100) | £107/10/- | £107/10/- |
| ,, 4½% 2nd Mort. Deb. Red. (£100) | £105/10/- | £105/10/- |
| Bradford Dyers' Association, Ltd. Ord. | 8/1½ | 8/1½ |
| ,, 5% Cum. Pref. | 10/7½ | 11/10½ |
| ,, 4% 1st Mort. Perp. Deb. (£100) | £86/10/- | £86/10/- |
| British Celanese, Ltd. 7% 1st Cum. Pfd. | 25/- | 25/- |
| ,, 7½% Part. 2nd Cum. Pref. | 21/3 | 21/9 |
| British Cotton & Wool Dyers' Association Ltd. Ord. (5/-) | 6/3 | 6/3 |
| ,, 4% 1st Mort. Deb. Red. (£100) | £97 | £96 |
| British Cyanides Co., Ltd. Ord. (2/-) | 4/3 | 4/3 |
| British Drug Houses, Ltd. Ord. | 21/3 | 21/3 |
| ,, 5% Cum. Pref. | 21/10½ | 21/10½ |
| British Glues and Chemicals, Ltd. Ord. (4/-) | 8/1½ | 8/1½ |
| ,, 8% Pref. (Cum. and Part.) | 30/- | 30/- |
| British Oil and Cake Mills, Ltd. Cum. Pfd. Ord. | 49/4½ | 48/9 |
| ,, 5½% Cum. Pref. | 25/7½ | 25/7½ |
| ,, 4½% First Mort. Deb. Red. (£100) | £107/10/- | £107/10/- |
| British Oxygen Co., Ltd. Ord. | 92/6 | 123/9 |
| ,, 6½% Cum. Pref. | 32/6 | 32/6 |
| British Portland Cement Manufacturers, Ltd. Ord. | 87/6 | 88/9 |
| ,, 6% Cum. Pref. | 28/9 | 30/- |
| Bryant & May, Ltd. Pref. | 67/6 | 67/6 |
| Burt, Boulton & Haywood, Ltd. Ord. | 20/- | 20/- |
| ,, 7% Cum. Pref. | 27/6 | 27/6 |
| ,, 6% 1st Mort. Deb. Red. (£100) | £102/10/- | £102/10/- |
| Bush, W. J., & Co., Ltd. 5% Cum. Pref. (£5) | 112/6 | 112/6 |
| ,, 4% 1st Mort. Deb. Red. (£100) | £96/10/- | £96/10/- |
| Calico Printers' Association, Ltd. Ord. | 8/1½ | 8/1½ |
| ,, 5% Pref. (Cum.) | 11/3 | 12/3 |

| Name. | March 10. | March 3. |
|---|---|---|
| Cellulose Acetate Silk Co., Ltd. Ord. | 12/10 | 12/10 |
| ,, Deferred (1/-) | 2/4½ | 2/4½ |
| Consett Iron Co., Ltd. Ord. | 13/3 | 13/6 |
| ,, 8% Pref. | 37/6 | 37/6 |
| ,, 6% First Deb. stock, Red. (£100) | £110/10/- | £110/10/- |
| Cooper, McDougal & Robertson, Ltd. Ord. | 37/6 | 37/6 |
| ,, 7% Cum. Pref. | 30/- | 30/- |
| Courtaulds, Ltd. Ord. | 51/7 | 53/1½ |
| ,, 5% Cum. | 25/7½ | 26/3 |
| Crosfield, Joseph, & Sons, Ltd. 5% Cum. Pre-Pref. | 25/- | 25/7½ |
| ,, Cum. 6% Pref. | 28/9 | 28/9 |
| ,, 6½% Cum. Pref. | 31/10½ | 31/10½ |
| ,, 7½% "A" Cum. Pref. | 32/6 | 32/6 |
| Distillers Co., Ltd. Ord. | 99/- | 101/3 |
| ,, 6% Pref. Stock Cum. | 32/- | 32/- |
| Dorman Long & Co., Ltd. Ord. | 28/9 | 27/6 |
| ,, Pref. Ord. | 42/6 | 41/3 |
| ,, 6½% Non-Cum. 1st Pref. | 25/3 | 25/- |
| ,, 8% Non-Cum. 2nd Pref. | 25/7½ | 25/7½ |
| ,, 4% First Mort. Perp. Deb. (£100) | £103/10/- | £103/10/- |
| ,, 5% 1st Mort. Red. Deb. (£100) | £105/10/- | £105/10/- |
| English Velvet & Cord Dyers' Association Ltd. Ord. | 3/9 | 4/4½ |
| ,, 5% Cum. Pref. | 7/6 | 7/6 |
| ,, 4% First Mort. Deb. Red. (£100) | £70/10/- | £72/10/- |
| Fison, Packard & Prentice, Ltd. Ord. | 45/7½ | 45/7½ |
| ,, 7% Non-Cum. Pref. | 31/10½ | 31/3 |
| ,, 4½% Debs. (Reg.) Red. (£100) | £106 | £106 |
| Gas Light and Coke Co. | 28/- | 28/- |
| ,, 3½% Maximum Stock (£100) | £90/10/- | £90/10/- |
| ,, 4% Consolidated Pref. Stock (£100) | £108/10/- | £108/10/- |
| ,, 3% Consolidated Deb. Stock, Irred. (£100) | £91/10/- | £92/10/- |
| ,, 5% Deb. Stock Red. (£100) | £118/10/- | £118/10/- |
| ,, 4½% Red. Deb. Stock (1960-65) (£100) | £115/10/- | £115/10/- |
| Goodlass Wall & Lead Industries, Ltd. Ord. (10/-) | 15/7½ | 15/7½ |
| ,, 7% Prefd. Ord. (10/-) | 13/9 | 13/9 |
| ,, 7% Cum. Pref. | 30/- | 30/- |
| Gossage, William, & Sons, Ltd. 5% 1st Cum. Pref. | 24/4½ | 24/4½ |
| ,, 6½% Cum. Pref. | 30/- | 30/- |
| Imperial Chemical Industries, Ltd. Ord. | 39/9 | 40/- |
| ,, Deferred (10/-) | 9/7½ | 9/7½ |
| ,, 7% Cum. Pref. | 34/- | 34/- |
| Imperial Smelting Corporation, Ltd. Ord. | 17/9 | 18/- |
| ,, 6½% Pref. (Cum.) | 25/7½ | 25/7½ |
| International Nickel Co. of Canada, Ltd. Cum. | $50 | $52 |

| Name. | March 10. | March 3. |
|---|---|---|
| Johnson, Matthey & Co., Ltd. 5% Cum. Pref. (£5) | 105/- | 105/- |
| ,, 4% Mort. Deb. Red. (£100) | £98/10/- | £98/10/- |
| Laporte, B., Ltd. Ord. | 122/6 | 117/6 |
| Lawes Chemical Co., Ltd. Ord. (1/-) | 8/9 | 9/4½ |
| ,, 7% Non-Cum. Part Pref. (10/-) | 10/- | 10/- |
| Lever Bros., Ltd. 7% Cum. Pref. | 32/- | 32/6 |
| ,, 8% Cum. "A" Pref. | 33/- | 33/6 |
| ,, 20% Cum. Prefd. Ord. | 79/4½ | 80/- |
| ,, 5% Cons. Deb. (£100) | £108/10/- | £108/10/- |
| ,, 4% Cons. Deb. (£100) | £106/10/- | £106/10/- |
| Magadi Soda Co., Ltd. 12½% Pref. Ord. (5/-) | 1/3 | 1/3 |
| ,, 6% 2nd Pref. (5/-) | 6d. | 6d. |
| ,, 6% 1st Debs. (Reg.) | £41 | £45 |
| Major & Co., Ltd. Ord. (5/-) | 7½d. | 7½d. |
| ,, 8% Part. Prefd. Ord. (10/-) | 9d. | 9d. |
| ,, 7½% Cum. Pref. | 1/6¾ | 1/6¾ |
| Pinchin, Johnson & Co., Ltd. Ord. (10/-) | 45/6 | 43/6 |
| ,, 1st Pref. 6½% Cum. | 32/- | 32/- |
| Potash Syndicate of Germany (Deutsches Kalisyndikat G.m.b.H.) 7% Gld. Ln. Sr. "A" and "B" Rd. | £72 | £74/10/- |
| Reckitt & Sons, Ltd. Ord. | 115/- | 118/9 |
| ,, 4½% Cum. 1st Pref. | 24/4½ | 24/4½ |
| Salt Union, Ltd. Ord. | 45/- | 45/- |
| ,, Pref. | 47/6 | 47/6 |
| ,, 4½% Deb. (£100) | £107/10/- | £107/10/- |
| South Metropolitan Gas Co. Ord. (£100) | £125/10/- | £126/10/- |
| ,, 6% Irred. Pref. (£100) | £149/10/- | £149/10/- |
| ,, 4% Pref. (Irred.) (£100) | £105 | £105 |
| ,, Perpetual 3% Deb. (£100) | £89/10/- | £89/10/- |
| ,, 5% Red. Deb. 1950-60 (£100) | £115/10/- | £115/10/- |
| Staveley Coal and Iron Co., Ltd.. Ord. | 50/7½ | 51/10½ |
| Stevenson & Howell, Ltd. 6½% Cum. Pref. | 26/3 | 26/3 |
| Triplex Safety Glass Co., Ltd. Ord. (10/-) | 87/6 | 90/- |
| Unilever, Ltd. Ord. | 32/6 | 33/1½ |
| ,, 7% Cum. Pref. | 30/3 | 31/- |
| United Glass Bottle Manufacturers, Ltd. Ord. | 45/- | 45/- |
| ,, 7½% Cum. Pref. | 32/6 | 32/6 |
| United Molasses Co., Ltd. Ord. (6/8) | 25/- | 25/7½ |
| ,, 6% Cum. Pref. | 26/3 | 26/3 |
| United Premier Oil & Cake Co., Ltd. Ord. (5/-) | 12/6 | 11/- |
| ,, 7% Cum. Pref. | 25/7½ | 25/7½ |
| ,, 4¼% Deb. Red. (£100) | £104 | £104 |

# Inventions in the Chemical Industry

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

## Specifications Open to Public Inspection

EMULSIFICATION OF OILS.—Standard Oil Development Co. Aug. 18, 1934. 10787/35.

ISO-ALLOXAZINE DERIVATIVES, process for manufacture.—F. Hoffmann-La Roche and Co. A.-G. Aug. 18, 1934. 18992/35.

DISPERSIONS OF HALOGENOBUTADIENES, production.—E. I. du Pont de Nemours and Co. Aug. 23, 1934. 23002/35.

MEANS FOR OPERATING COMBUSTION ENGINES with liquefied gases. I. G. Farbenindustrie. Aug. 18, 1934. 23066/35.

RESIDUAL GASES OF SUPERPHOSPHATE MANUFACTURE, method of treating.—Naamlooze Vennootschap Philips' Gloeilampenfabrieken. Aug. 23, 1934. 23185/35.

SHAPING POLYMERIC ACRYLIC ACID NITRIDE, process.—I. G. Farbenindustrie. Aug. 21, 1934. 23258/35.

CHRYSENE-CARBOXYLIC ACIDS, manufacture.—I. G. Farbenindustrie. Aug. 18, 1934. 23262/35.

POLYVINYL DERIVATIVES CONTAINING NITROGEN, manufacture.—I. G. Farbenindustrie. Aug. 21, 1934. 23366/35.

PURIFYING GASES and apparatus therefor, method.—I. G. Farbenindustrie. Aug. 22, 1934. 23367/35.

VACUUM DISTILLATION OF HYDROGEN PEROXIDE and other easily decomposable liquids.—J. Mercier. Aug. 21, 1934. 23472/35.

HALOGENATED MIXED ETHERS, manufacture.—British Thomson-Houston Co., Ltd. Aug. 23, 1934. 23493/35.

RESIN EMULSIONS, production.—Bakelite, Ltd. Aug. 22, 1934 23522-3/35.

PURIFYING HORMONE PREPARATIONS, process.—Soc. of Chemical Industry in Basle. Aug. 24, 1934. 23590/35.

CYCLOPENTANO POLYHYDRO PHENANTHRENE SERIES, manufacture of compounds.—Schering-Kahlbaum A.-G. Aug. 22, 1934. 23621/35.

WETTING AGENTS FOR ALKALI LYES.—Chemical Works (formerly Sandoz. Aug. 24, 1934. 23668/35.

RECOVERY OF ALGINOUS MATERIAL from seaweed.—V. C. E. Le Gloahec, and J. R. Herter. Jan. 11, 1934. 5177/36.

## Specifications Accepted with Date of Application

ALKYLATED AND ARALKYLATED POLYAMINOANTHRAQUINONES, manufacture.—W. W. Groves (I. G. Farbenindustrie). Aug. 9, 1934. 442,726.

VAT DYESTUFFS, manufacture.—I. G. Farbenindustrie. Aug. 9, 1933. 442,536.

REMOVING LOW-BOILING ALDEHYDES from commercial dioxan, process.—W. W. Triggs (Haardt and Co., A.-G.). Aug. 9, 1934. 442,540.

AZO DYESTUFFS, process for manufacture.—I. G. Farbenindustrie. Aug. 11, 1933. (Addition to 425,167.) 442,550.

ABRASIVES, manufacture.—I. G. Farbenindustrie. Aug. 12, 1933. 442,599.

DYESTUFF INTERMEDIATES, manufacture.—E. I. du Pont de Nemours and Co. Aug. 11, 1933. 442,730.

PHOTOGRAPHIC GELATINE EMULSIONS, production.—W. W. Groves (I. G. Farbenindustrie). Aug. 13, 1934. 442,731.

DYESTUFFS OF THE FLUORINDINE SERIES, manufacture.—I. G. Farbenindustrie). Aug. 11, 1933. 442,732.

AZO DYESTUFF, manufacture.—I. G. Farbenindustrie. Aug. 12, 1933. 442,733.

HYDROCYANIC ACID, manufacture.—E. I. du Pont de Nemours and Co., P. J. Carlisle and A. D. Macallum. Aug. 13, 1934. 442,737.

AZO DYESTUFFS, process for manufacture.—I. G. Farbenindustrie. Aug. 15, 1933. 442,778.)

FURNACES FOR THE PRODUCTION OF HOT GASES.—W. F. Carey and Imperial Chemical Industries, Ltd. Aug. 14, 1934. 442,779.

BERYLLIUM OXYFLUORIDE and metallic beryllium therefrom, preparation.—G. N. Kirsebom and Calloy, Ltd. Aug. 15, 1934. 442,601.

ORGANIC SULPHUR COMPOUNDS, manufacture and production.—Coutts and Co. and F. Johnson (legal representatives of J. Y. Johnson (deceased) ). (I. G. Farbenindustrie.) Sept. 24, 1934. 442,607.

CATALYSTS particularly suitable for hydrogenation treatment, production.—H. E. Potts (International Hydrogenation Patents Co., Ltd.). Dec. 27, 1934. 442,573.

NEUTRAL MIXED FERTILISER, production.—Kali-Forschungs-Anstalt Ges. Jan. 27, 1934. 442,623.

MIXTURE OF NITROGEN AND HYDROGEN by gasefication of carbon under pressure.—G. Fauser. Feb. 2, 1934. 442,574.

SURFACE ALLOYS BY DIFFUSION, production.—F. Bergmann. March 8, 1934. 442,629.

ANHYDROUS MAGNESIUM CARBONATE (magnesite), production.—I. G. Farbenindustrie. May 19, 1934. 442,764.

CELLULOSE DERIVATIVES, process for manufacture.—British Celanese, Ltd. April 10, 1934. 442,635.

QUATERNARY AMMONIUM SALTS, manufacture.—Soc. of Chemical Industry in Basle. April 23, 1934. 442,767.

## Applications for Patents

**(February 20 to 26 inclusive.)**

DEVICES FOR PROJECTING PULVERISED MATERIALS.—Acme Chemical Co., Ltd. 5617.

HYDROGEN PEROXIDE, manufacture.—E. Berl. 5601.

ETHERS, manufacture.—E. Berl. 5602.

CATALYTIC OXIDATION PROCESSES.—E. Berl. 5603.

SAFETY GLASS, manufacture.—E. Berl. 5604.

INDIGOID DYESTUFFS, manufacture.—A. G. Bloxam (Soc. of Chemical Industry in Basle). 5755.

APPARATUS FOR EXTRACTING ORGANIC ACIDS from their diluted aqueous solutions.—F. Blumenthal, T. Schultz, Soc. Immobiliere et Industrielle Aniversoise (S.I.M.I.N.A.) Soc. Anon. (Germany, Feb. 28, '35.) 5760.

2.4-DIHALOGEN-5-HYDROXYMETHYL-6-ALKYLPYRIMIDINES, manufacture.—A. Carpmael (I. G. Farbenindustrie)). 5211.

—EVAPORATION OF LIQUIDS, apparatus.—Chemische Fabrik Budenheim. (Germany, March 25, '35.) 5802.

MEANS FOR CARRYING OUT CATALYTIC REACTIONS.—Coutts and Co. (legal representatives of J. Y. Johnson) (I. G. Farbenindustrie). (Feb. 27, '35.) 5311.

PIGMENTED PROTECTIVE COATINGS, manufacture.—J. P. Crouet. 5739.

WATER-INSOLUBLE AZO DYESTUFFS, manufacture.—M. A. Dahlen, E. I. du Pont de Nemours and Co., and M. E. Friedrich. 5794.
DISTILLATION OF COAL.—T. M. Davidson. 5413.
FLOTATION PROCESSES, ETC.—F. B. Dehn (Potash Co. of America). 5651.
HYDRATION OF OLEFINES.—Distillers Co., Ltd. 5623.
SURFACE-ACTIVE COMPOUNDS and their manufacture.—E. I. du Pont de Nemours and Co. (United States, Feb. 25, '35.) 5531.
CELLULOSE ESTERS, production.—E. I. du Pont de Nemours and Co. (United States, Feb. 23, '35.) 5532.
CELLULOSE ESTERS, dyeing.—L. S. E. Ellis (Soc. Rhodiaceta). 5554.
EMULSIONS AND THEIR HOMOGENISATION, production.—P. Freedman and W. J. Rickets. 5474.
CARBONISATION OF COAL, ETC.—A. R. Griggs. 5559.
PRINTING WITH VAT DYESTUFFS.—W. W. Groves (I. G. Farbenindustrie). (Aug. 22, '34.) 5754.
MEANS FOR THE PREVENTING THE FORMATION OF ICE on exposed surfaces.—Harshaw Chemical Co. (United States, Feb. 20, '35.) 5131.
ALKALI FERROCYANIDES, production.—E. Hene. 5300.
RUBBER COMPOSITIONS.—I. G. Farbenindustriee. (Germany, Feb. 21, '35.) 5210.
SYNTHETIC RESINS, manufacture.—E. L. Holmes. 5514.
PRINTING WITH VAT AND SULPHUR DYESTUFFS.—Imperial Chemical Industries, Ltd. 5302.
COLOURING OF LEATHER.—Imperial Chemical Industries, Ltd. 5303.
INTERMEDIATES AND COLOURING MATTERS, manufacture.—Imperial Chemical Industries, Ltd. and J. S. H. Davies. 5530.
CARBONISATION OF COAL.—S. Lawson. 5516.
COAL-AND-OIL EMULSIONS, production.—S. Lawson. 5643.
VOLATILE SOLVENTS in extraction plants for oils, etc., recovery.—Montecatini Soc. Generale per l'Industria Mineraria ed Agricola. (Italy, Feb. 25, '35.) 5150.
PIGMENTS.—New Jersey Zinc Co. (United States, April 6, '35.) 5377.
SULPHONATED FATTY ACIDS, ETC., production.—S. Z. Perlmutter. 5168.
CALCINING LITHOPONE, apparatus.—Sachtleben Akt.-Ges. für Berghau und Chemische Industrie. (Germany, Feb. 21, '35.) 5207.
ESTERS, especially ethyl acetate, manufacture.—Usines de Melle. (France, Feb. 27, '35.) 5178.
MONOCALCIUM PHOSPHATE.—Victor Chemical Works. (United States, March 4, '35.) 5484.

# From Week to Week

PLANS HAVE BEEN APPROVED for the erection of a new tallow works at Greenhill Road, Paisley, for William Fraser and Co., Ltd., oil and tallow refiners, Paisley.

THE TREASURY HAS MADE AN ORDER under Section 10 (5) of the Finance Act, 1926, exempting allyl paracetaminophenol from Key Industry Duty from March 12 until August 19. The Order will shortly be published by H.M.' Stationery Office.

THE CHEMICAL CONSTITUTION, standardisation and clinical application of vitamins is discussed very fully in a booklet recently published by the British Drug Houses, Ltd. Included are notes on the clinical use of the different B.D.H. preparations in which vitamins are made available for medicinal use, and a profusion of references to current medical literature bearing on the subject.

THE NEW COKE OVEN INSTALLATION which has been erected at the Govan Ironworks, Glasgow, by William Dixon, Ltd., is now in course of heating up. This process takes about seven weeks, after which the whole coking and by-product plant will be ready for operation. The new ovens—50 in all—will give an annual output of metallurgical coke amounting to 182,000 tons.

THE SEAFOIL COMPANY, a Scottish firm, which recently opened a factory on the Kintyre coast of Argyllshire for the manufacture of cellophane from seaweed, has been carrying out preliminary investigations in South Uist, with the object of extending its activities. A suitable site for one of the factories has been found near Lochboisdale, and it is expected that work will shortly be found for a large number of the islanders. The latest discovery that cellophane can be manufactured from the dense masses of seaweed that cling to the rocky Hebridean shores may restore some of the prosperity lost to the Western Isles when the kelp industry declined.

A CONSIDERABLE EXTENSION of the plants now extracting oil from British coal was promised by Colonel Whiston A. Bristow at the annual dance of the Barugh (Barnsley) and Askern staffs of Low Temperature Carbonisation, Ltd. at Doncaster on March 6. "Unfortunately, the security of the British Empire has been greatly imperilled because the work of defending the Empire has been shifted from coal to oil" he said. "The British Empire does not produce five per cent. of the world's supply of oil, and so we must build up an enormous production of oil from coal, for that alone can defend us in another world contest. At the present time we only have three works but there will be many more and we shall become a great family. We are making a tremendous contribution to the safeguarding of the country."

PRESIDING AT THE 17TH ANNUAL GENERAL MEETING of the English China Clays, Ltd., Mr. R. Martin remarked that the trade in 1935 showed an improvement over the previous year by approximately 4.3 per cent. This had been achieved in spite of the fact that during a large portion of the year the Italian market had been lost. This loss had been serious but only temporarily, but it served as a reminder of our dependence upon national and international peace and goodwill for a continuance of commercial prosperity. The continued improvement in the profits was a source of great satisfaction and indicated that the policy adopted by the company of amalgamation and rationalisation had been and was being fully justified. Mr. Martin referred to the purchase of the freehold of several of their important works especially in the development policy of extended electrification and general rationalisation and places the English Clays, Lovering Pochin and Co., Ltd., in the position of controlling the largest acreage of the best china clay lands in Devon and Cornwall.

THE NORTH-EASTERN ICE CO., Aberdeen, is to extend its premises and install new plant for ice-making, additional to its present resources, the whole scheme to cost £20,000.

THE WAGES of the Scottish members of the Amalgamated Society of Dyers, regulated by the cost of living agreement, are increased for the quarter ending April, 1936. The increased range from 7d. to 8d. a week for men over 21 and from 2d. to 5d. for other workers.

THE BRITISH OXYGEN CO., LTD., at an extraordinary general meeting on March 5, unanimously passed a resolution capitalising £552,372 of the general reserve and distributing among ordinary stockholders two ordinary shares for every £7 of ordinary stock held. A further resolution was passed making certain alterations in the memorandum of association, having the effect of extending the objects of the company.

THE REMINGTON ARMS CO., it is reported from New York, has joined with Imperial Chemical Industries, Ltd., in oragnising a new Brazil company—Companhia Brazileira de Cartuchos—with the announced purpose of preserving the established position of the Brazil market for sporting ammunition. The new company has acquired the assets and business of a local company manufacturing sporting ammunition.

AN ANONYMOUS DONOR is generously placing considerable funds at the disposal of the University of Birmingham for an investigation, by Professor W. N. Haworth, F.R.S., head of the Department of Chemistry, with a view to exploring the possibility of the production of an improved form of insulin. Professor Haworth has consented to be personally responsible for this investigation, on condition that he is assured of adequate co-operation in certain directions.

WITH THE OBJECT of introducing Coventry manufacturers, large and small, to a world audience of potential new customers, Coventry City Council has issued an excellently produced "Directory of Coventry Manufacturers." The directory, containing essential information about individual firms, is well illustrated and with its historical notes presents both a work of reference and a reliable picture of the industrial activities of the city.

THE NATIONAL SMOKE ABATEMENT SOCIETY has arranged a visit to the electrical dust precipitation plant at the Birmingham Corporation's power stations at Hams Hall and Nechells on April 2. The visit will be preceded by a meeting in the Council Chamber, Town Hall, Birmingham, at which Mr. F. Forrest, chief engineer of the Electricity Department, will give an address on the plant to be inspected. The plant is of the latest type and has only recently been installed. It is of special interest in view of the recent discussions on the prevention of dust and grit emission.

THE ASSOCIATION OF BRITISH IMPORTERS FROM ITALY was formed at a meeting at Winchester House, Old Broad Street, on February 25, attended by representatives of sixty firms and companies "for the purpose of employing all or any constitutional and legal means to obtain for its members compensation for trading losses arising directly or indirectly from the imposition of sanctions against Italy." Mr. Arnold Whittick was elected secretary, and the offices of the Association are temporarily situated at 11-13 Dowgate Hill, E.C.4. The collection of data with regard to trade losses, already sustained and likely to be sustained with the continuance of sanctions, is engaging the committee's attention with a view to the presentation of a case for the consideration of the Government.

# Forthcoming Events

**LONDON**

**Mar. 17.**—The Institution of Civil Engineers. "Some Major Problems in the Utilisation of Coal." Dr. F. S. Sinnatt. 6 p.m. Great George Street, Westminster, London.

**Mar. 17.**—British Association of Refrigeration. Sessional meeting. 85-88 Minories, London, E.C.3.

**Mar. 18.**—Electrodepositors' Technical Society. "Power Supply for Electroplating with Particular Reference to Rectification." A. Smart. 8.15 p.m. Northampton Polytechnic Institute, St. John Street, Clerkenwell, London.

**Mar. 18.**—Royal Microscopical Society. Joint meeting with the Society of Chemical Industry (Food Group). "The Microscope in General Food Analysis," Andrew More; "The Fluorescence Microscope for the Examination of Foods," J. E. Barnard; "The Microscope in the Brewery," F. A. Hatch; "The Search for Diagnostic Structures." T. E. Wallis. 4 p.m. London School of Hygiene and Tropical Medicine, Kepple Street, Gower Street, London.

**Mar. 19.**—The Chemical Society and the Biochemical Society. Discussion on "The Chemistry and Biochemistry of Lipoids." Professor A. C. Chibnall, Dr. S. H. Piper, Dr. J. H. Quastel, Professor H. J. Channon, Dr. G. R. Cameron. 8 p.m. Burlington House, Piccadilly, London.

**BELFAST**

**Mar. 19.**—Institute of Chemistry (Belfast Section). "Industrial Biochemistry in Northern Ireland." Dr. W. H. Gibson. 7.30 p.m. Physics Lecture Theatre of the Royal Belfast Academical Institution.

**BIRMINGHAM**

**Mar. 17.**—Institute of Metals (Birmingham Section). "Recent Developments in Metallurgy." Professor D. Hanson. 7 p.m. James Watt Memorial Institute, Birmingham.

**Mar. 19.**—The Institute of Vitreous Enamellers (Midland Section). "Acid-Proof Enamelling." C. P. Stone. 7.30 p.m. Chamber of Commerce, New Street, Birmingham.

**DERBY**

**Mar. 20.**—Institute of Fuel. (East Midland Section). "Research in Refractory Materials." A. T. Green. 7 p.m. Derby Technical College, Derby.

**EDINBURGH**

**Mar. 17.**—Institute of Chemistry and Society of Chemical Industry (Edinburgh Sections). "Peculiar Analyses." A. R. Jamieson. 7.30 p.m. North British Station Hotel, Princes Street, Edinburgh.

**LEICESTER**

**Mar. 20.**—Leicester Literary and Philosophical Society (Chemistry Section). "The Iraq Pipe Line." Sir John Cadman. 7.30 p.m. College of Technology, Leicester.

**LIVERPOOL**

**Mar. 20.**—Society of Chemical Industry (Liverpool Section). Annual meeting of the Section. "Some Properties of Chlorinated Rubber," Dr. J. P. Baxter. 6 p.m. University, Liverpool.

**MANCHESTER**

**Mar. 18.**—Manchester Metallurgical Society. Open Discussion led by E. W. Colbeck. "Materials and Maintenance of Lifting Gear." Annual meeting. 7 p.m. Engineers' Club, Albert Square, Manchester.

**Mar. 19.**—The Institute of Chemistry (Manchester Section). Annual general meeting. "Chemistry and Business." Dr. H. Hepworth. 7 p.m.. Manchester.

**NEWCASTLE-ON-TYNE**

**Mar. 17.**—Institute of Metals (N.E. Coast Section). "Foundry Costing." S. G. Homfray and R. A. Balderston. 7.30 p.m. Armstrong College, Newcastle-on-Tyne.

**Mar. 20.**—North-East Chemical Societies' Annual Dinner. 7.30 p.m. Royal Station Hotel, Newcastle-on-Tyne.

**STOURBRIDGE**

**Mar. 17.**—Society of Glass Technology (Midlands Section). Annual dinner. 7.30 p.m. Talbot Hotel, Stourbridge.

**Mar. 18.**—Society of Glass Technology. General meeting. 2 p.m. Talbot Hotel, Stourbridge. "Some Considerations in Photographing Glass for Commercial and Other Purposes," Charles Wormald; "The Photographic Application of the Polar Screen," J. L. Houghton; "Notes on the Photography of Specific Pieces of Glassware," A. E. J. Vickers and D. P. Lewis; "Glassware Finishing Machinery with Special Reference to Tableware," E. Venis, B.Sc., A.M.I.Mech.E.

**SWANSEA**

**Mar. 17.**—Institute of Metals (Swansea Section). "Metallurgical Control and the Bronze Foundry," A. J. Murphy. 6.30 p.m. Y.M.C.A., Swansea.

# Company News

**Midland Tar Distillers.**—The payment is announced of a dividend of 2½ per cent. in respect of the year ending June 30, 1936.

**Doulton and Co.**—The dividend on the 5 per cent. cumulative preference shares for the year ended December 31, 1935, has been declared payable on April 1.

**Burt, Boulton and Haywood.**—The payment is announced of an interim dividend of 2½ per cent. less tax. The interim dividend in 1935 was 2 per cent., followed by a final payment of the same amount.

**Reckitt and Sons.**—A final ordinary dividend of 6¼ per cent. and a bonus of 1¼ per cent., making a total payment of 22½ per cent., less tax, has been declared in respect of 1935. Similar distributions have been made since 1931.

**United Glass Bottle Manufacturers.**—A final dividend is announced of 5 per cent., less tax, accompanied by a bonus of 2½ per cent., less tax. With the interim of 2½ per cent. this makes a total payment of 10 per cent. for 1935. In 1934 the distribution amounted to 9 per cent., including a 1½ per cent. bonus.

**International Nickel of Canada.**—The payment of a dividend at the rate of 7 per cent. per annum is announced on preferred stock for the quarter, payable (in London) in sterling at the cable rate of exchange on New York obtaining in London at the opening of business on May 1.

**Boots Pure Drug Co.**—A dividend of 6 per cent. has been declared on the ordinary shares, for the quarter to March 31 next. This makes a total in interims to date of 24 per cent., less tax, the same as for the year to March 31, 1935. For that year and a number of previous years a bonus of 5 per cent., tax free, was paid in addition.

**Dominion Tar and Chemical Co.**—The net operating profit for 1935 amounted to $966,012, against $553,629 in the previous year. The net profit was $243,562, against net loss $64,022. To this is added discount on debentures redeemed, $3,376 and $518,098 brought in, making $765,038. The dividend on preference shares of Alberta Wood Preserving Co. absorbs $19,692; to preference stock sinking fund reserve of that company is placed $3,934, leaving a balance of $741,410 to go forward.

**British Oil and Cake Mills.**—The total profits for the past year is reported to be up from the 1934 level of £665,801 to £742,963, and after expenses, fees and interest, the maintenance of depreciation provision at £30,000 and reduced income-tax allowance (£67,772, against £101,641), the net revenue balance is more than £100,000 higher at £586,836. Preference distributions take £31,674, and the preferred ordinary dividend, again 12½ per cent., absorbs £281,811. The dividend on the £3,500,000 ordinary stock held by Lever Bros. is raised from 6 per cent. to 10 per cent., and requires £271,250 net, compared with £162,750. The carry-forward is £51,210.

**Canadian Celanese.**—The report for 1935 shows that the net profit was $1,602,960, compared with $1,504,708 in the previous year. During the year the regular $7.00 dividend on the 7 per cent. cumulative participating preferred stock, amounting to $630,000.00, was paid, and a participating dividend of $1.91 per share, aggregating $171,900.00, was paid in respect of the earned surplus to January 1, 1935. A sum of $89,000.00 has been appropriated out of the net profits for the year for payment of interest for 1935 on Income Funding Rights outstanding at December 31, 1935. The participating dividend to which the preferred shareholders are entitled with respect to 1935 will be paid when declared by the directors to the surplus account.

# Chemical Trade Inquiries

**The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).**

**British India.**—The Director of Contracts, A.H.Q., Simla, invites tenders for 25 tons aluminium, 99 per cent. pure. Forms of tender obtainable from the Director-General, India Store Department, Belvedere Road, Lambeth, London, S.E.1, at a fee of 5s., which will not be returned. Tenders must be cabled direct to the Director of Contracts, A.H.Q., Simla, to reach him not later than March 16, 1936.

**South Africa.**—H.M. Trade Commissioner at Johannesburg reports that the South African Railways and Harbours Administration is calling for tenders, to be presented in Johannesburg by April 20, 1936, for the supply of one 200-ton hydraulic press. (Ref. T.Y./5759.)

**Sweden.**—An agent established at Gothenburg wishes to obtain the representation, on a commission and/or purchasing basis, of United Kingdom manufacturers of chemicals for the textile industry, including sizing and furnishing material. (Ref. No. 169.)

**Egypt.**—A firm of merchants and commission agents established at Cairo desires to obtain the agencies of firms in the United Kingdom in a position to supply cod-liver oil and hydrogenated fats. (Ref. No. 173.)